

Riparian Forest Buffer

WV Supplement – Recommended Tree/Shrub Species

Code 391

Purpose

This supplement provides a listing of recommended tree/shrub species and their attributes for riparian forest buffer plantings.

Considerations

The attached list contains species that are recommended for planting or encouragement through natural regeneration in riparian areas. This list is not all inclusive. Other species may occur or be beneficial on a particular site. The columns on the attached table provide information on a variety of considerations.



SOIL DRAINAGE CLASS

This column provides additional information concerning the favorable drainage conditions for survival and growth of the plant. See footnote at the bottom of Table 2.

SHADE TOLERANCE

Shade tolerance describes the relative tolerance for this plant to grow in shade conditions. See footnote at the bottom of Table 2.

HEIGHT AT 20 YEARS

This indicates the approximate height in feet of the plant at 20 years under optimal growing conditions.

MATURE HEIGHT

This indicates the approximate height in feet of the plant at maturity under good conditions.

WILDLIFE

Wildlife utilize riparian areas for a variety of life functions due to their diverse plant communities, complex structure, and close proximity to water. Selection of planting material should be based on wildlife needs for food, cover and shelter for a variety of species.

- Food: The plants listed in this column are suited to provide various wildlife species food in the form of browse of the foliage, twigs, bark or fruit.
- Cover: This plant is suited to provide winter cover, nesting cover or temporary shelter by its growth characteristics for a variety of animals.

- Corridor: This plant is suited to use in corridors or travel lanes, including riparian areas, through which wildlife may travel between habitat types.
- Pollinator: These species produce resources that attract, support or are pollinated by native bees, butterflies, hummingbirds, various beneficial insects, beetles or flies. There are a few species that provide mostly nesting and overwintering protection; although these species may also provide some secondary pollinator resources.
- Spacing: This spacing is suggested if wildlife habitat is desired.

An "X" in any of the above columns indicates that a tree or shrub is suitable to use for that particular purpose.

WOOD PRODUCTION

An "X" in this column indicates that a particular species is often used for wood production purposes when planted in a riparian area.

Trees/shrubs highlighted in gray on the attached table are considered non-native (i.e., they do not occur naturally in West Virginia).

Refer to WV Practice Standard 612 Tree/Shrub Establishment for more information concerning spacing for timber production.

REMARKS

This column provides additional information concerning establishment, various growth habits, suitable conditions, etc.

Specifications

This list is not all inclusive and many more tree and shrub species are suitable for establishment in riparian forest buffers for a variety of purposes. Refer to the WV conservation practice standards Tree/Shrub Establishment (612) and Riparian Forest Buffer (391), and/or their corresponding job sheets for more information about establishing riparian areas through planting or natural regeneration.

It is also important to remember that a precondition for tree/shrub establishment is an appropriately prepared site. **Site preparation is needed if competition from grass, weeds, and/or woody materials will interfere with plant establishment and growth.**

Refer to Tree/Shrub Site Preparation (490), Brush Management (314) and/or Herbaceous Weed Control (315), as applicable. **Maintaining the trees/shrubs after planting is also critical to success.**

Clients should work closely with NRCS, WV Division of Forestry and/or West Virginia Division of Natural Resources personnel when developing and implementing tree/shrub establishment plans in riparian areas.

Table 1. Shrub species recommended for planting or encouragement through natural regeneration in riparian areas. Shrubs shaded in gray are considered non-native (i.e., they do not occur naturally in West Virginia). This listing of shrub species is not all-inclusive; many more native shrubs which occur and could be suitable for use in conservation plantings. Consult with the NRCS, West Virginia Division of Forestry and/or the West Virginia Division of Natural Resources for regarding other species. See footnotes at the bottom of Table 2.

SHRUBS	Soil Drainage Class ¹	Shade Tolerance ²	Height at 20 Years	Approx. Height at Maturity	Wildlife					Remarks
					Food	Cover	Corridor	Pollinator	Spacing	
Alder, Common (<i>Alnus serrulata</i>)	S.P.D. - P.D.	Tolerant	10 ft	20 ft	X		X		5-8 ft	Adapted to wetter sites and along streams; good wetland wildlife cover and food source.
Arrowwood (<i>Viburnum dentatum</i>)	S.W.D. - P.D.	Intermed.	10 ft	10 ft	X	X	X	X	3-6 ft	Excellent wildlife food source. Adapted for wetter conditions
Buttonbush (<i>Cephalanthus occidentalis</i>)	S.P.D. - P.D.	Tolerant	10 ft	20 ft	X	X	X	X	5-8 ft	Only suited for very wet sites. Will tolerate flooding. Provides food and cover for waterfowl.
Chokeberry, Red (<i>Photinia pyrifolia</i>)	S.P.D. - P.D.	Intolerant	5 ft	5 ft	X		X	X	3-6 ft	Low-growing attractive shrub and wildlife food plant. Birds utilize the fruit throughout the winter months. Frequently used as an ornamental
Crabapple, Sargent's (<i>Malus sargentii</i>)	W.D. - S.P.D.	Intolerant	10 ft	10 ft	X		X	X	3-6 ft	Has persistent fruit that is somewhat valuable to wildlife through winter months. Attractive and hardy.
Crabapple, Southern (<i>Malus angustifolia</i>)	W.D. - M.W.D.	Intermed.	15 ft	25 ft	X		X	X	5-8 ft	If near red cedars keep a minimum distance of 500 feet to prevent spread of cedar apple rust.
Dogwood, Gray (<i>Cornus racemosa</i>)	S.W.D. - S.P.D.	Tolerant	10 ft	15 ft	X	X	X		5-8 ft	Excellent for small screens, streambank stabilization and as an ornamental.
Dogwood, Redosier (<i>Cornus sericea</i>)	S.P.D. - P.D.	Intermed.	10 ft	20 ft		X	X		5-8 ft	Excellent streambank cover. With some wildlife benefits.
Dogwood, Silky (<i>Cornus amomum</i>)	W.D. - S.P.D.	Tolerant	12 ft	12 ft	X	X	X		3-6 ft	Capable of forming thickets where stems contact the ground and form roots; produces fruit in 3 -5 years; excellent wildlife plant.
Elderberry (<i>Sambucus canadensis</i>)	W.D. - S.P.D.	Intolerant	7 ft	7 ft	X	X	X	X	3-6 ft	Excellent all around wildlife plant. Suckers freely. Many species of birds and mammals utilize the fruit.
Hawthorn, Washington (<i>Crataegus phaenopyrum</i>)	W.D. - S.P.D.	Intermed.	25 ft	25 ft		X	X	X	5-8 ft	Provides excellent wildlife cover. Not as prone to spreading as some introduced hawthorns.
Hazelnut, American (<i>Corylus americana</i>)	W.D. - M.W.D.	Tolerant	10 ft	10 ft	X	X	X		3-6 ft	Provides cover and nesting for wildlife. The leaves, twigs, and catkins are heavily browsed by rabbits and deer. Utilize protection when planting.
Holly, American (<i>Ilex opaca</i>)	W.D. - S.P.D.	Tolerant	20 ft	60 ft		X	X		5-8 ft	Evergreen. It is important to plant males as well as females if berry production is desired. Used as winter cover and ornamental.

SHRUBS	Soil Drainage Class ¹	Shade Tolerance ²	Height at 20 Years	Approx. Height at Maturity	Wildlife					Remarks
					Food	Cover	Corridor	Pollinator	Spacing	
Nannyberry (<i>Viburnum lentago</i>)	W.D. - P.D.	Tolerant	25 ft	25 ft	X	X	X	X	5-8 ft	Excellent wildlife, hedgerow, screen and ornamental shrub suited to a variety of sites. Commercially available and common throughout WV.
Ninebark (<i>Physocarpus opulifolius</i>)	W.D. - S.P.D.	Intolerant	10 ft	10 ft	X		X	X	5-8 ft	Tolerates a wide variety of conditions including nuclear attack. Difficult to eradicate once established. Used by a variety of riparian birds.
Possumhaw (<i>Viburnum cassinoides</i>)	S.P.D. - P.D.	Tolerant	15 ft	15 ft	X	X	X	X	5-8 ft	Excellent wildlife shrub in wetter conditions. Suited to the eastern mountain counties.
Spicebush, Northern (<i>Lindera benzoin</i>)	M.W.D. - P.D.	Intermed.	12 ft	15 ft	X		X	X	5-8 ft	Attractive fragrant understory tree common throughout the state. Sometimes planted as an ornamental.
Steeplebush (<i>Spiraea tomentosa</i>)	S.P.D. - P.D.	Intolerant	4 ft	6 ft	X		X	X	3-6 ft	Rhizomatous growth form that provides dense wildlife cover relatively quickly. Usually found on wetter sites.
Swamp Rose (<i>Rosa palustris</i>)	S.P.D. - P.D.	Tolerant	8 ft	8 ft		X	X	X	3-6 ft	Prefers permanent saturation. May spread under suitable conditions.
Willow, Purpleosier (<i>Salix purpurea</i>)	W.D. - P.D.	Intolerant	10 ft	10 ft			X		--	Excellent streambank stabilization and bio engineering plant suitable to dormant plantings. Many cultivars are available.
Willow (<i>Salix spp.</i>)	W.D. - P.D.	Intolerant	10 ft	10 ft			X		--	Many varieties of native and non-native species. Suitable for streambank stabilization and bio engineering projects.
Witch Hazel (<i>Hamamelis virginiana</i>)	W.D. - S.P.D.	Intermed.	15 ft	20 ft	X		X		5-8 ft	Good native wildlife food source. Sometimes hard to establish.

Table 2. Tree species recommended for planting or encouragement through natural regeneration in riparian areas. Trees shaded in gray are considered non-native (i.e., they do not occur naturally in West Virginia). This listing of tree species is not all-inclusive; many more native shrubs which occur and could be suitable for use in conservation plantings. Consult with the NRCS, West Virginia Division of Forestry and/or the West Virginia Division of Natural Resources for regarding other species. See footnotes at the bottom of Table 2.

TREES	Soil Drainage Class ¹	Shade Tolerance ²	Height at 20 Years	Approx. Height at Maturity	Wildlife					Wood Production Spacing	Remarks
					Food	Cover	Corridor	Pollinator	Spacing		
Hornbeam, American (<i>Carpinus caroliniana</i>)	M.W.D. - S.P.D.	Tolerant	15 ft	40 ft	X		X		5-8 ft		This species produces large amounts of seed eaten by many birds and mammals. Found along streams and rivers. Excellent riparian species.
Basswood (<i>Tilia americana</i>)	W.D. - M.W.D.	Intermed.	45 ft	80 ft	X		X	X	8-12 ft		Basswood is good browse and buds are important for birds and deer in winter. Planted as a shade tree or ornamental.
Birch, Black (<i>Betula lenta</i>)	W.D. - S.P.D.	Intolerant	40 ft	80 ft		X	X		8-12 ft		
Birch, River (<i>Betula nigra</i>)	W.D. - S.P.D.	Intolerant	40 ft	70 ft		X	X		8-12 ft		Native riparian tree. Its young twigs, buds, foliage and seeds are used by a variety of wildlife.
Blackgum (<i>Nyssa sylvatica</i>)	W.D. - S.P.D.	Tolerant	30 ft	100 ft	X		X	X	8-12 ft		Black bears, foxes, wood ducks, wild turkeys, robins, brown thrashers, thrushes, and flickers frequently eat the fruit.
Boxelder (<i>Acer negundo</i>)	W.D. - P.D.	Intermed.	35 ft	60 ft			X		8-12 ft		Very quick growing. Found along streams and frequently flooded areas. Relatively short lived and often disease prone.
Cedar, Northern White (<i>Thuja occidentalis</i>)	W.D. - S.P.D.	Intermed.	25 ft	50 ft		X	X		8-12 ft		Also called Arborvitae. Popular ornamental for screens and hedgerows in limestone areas. Provides some nesting cover.
Cherry, Black (<i>Prunus serotina</i>)	W.D. - S.P.D.	Intolerant	40 ft	100 ft	X		X	X	8-12 ft	20 X 20 ft	Valuable wildlife food source. Used for commercial timber and ornamental purposes on a wide variety of soils. Care should be taken when planting in riparian areas as cherry can be toxic to livestock in a wilted state. Consider planting in interior areas of the RFB.
Chestnut, Chinese (<i>Castanea mollissima</i>)	W.D. - M.W.D.	Intolerant	25 ft	70 ft	X		X		8-12 ft		Mostly planted as an ornamental. Some wildlife utilize the chestnuts. May also consider American Chestnut Hybrid
Cottonwood, Eastern (<i>Populus deltoides</i>)	W.D. - S.P.D.	Intermed.	50 ft	120 ft		X	X		8-12 ft		Fast growing and used in reclamation. Hybrids make good selections for windbreaks in multi-row installations. Some varieties are suitable for carbon sequestration.

TREES	Soil Drainage Class ¹	Shade Tolerance ²	Height at 20 Years	Approx. Height at Maturity	Wildlife					Wood Production Spacing	Remarks
					Food	Cover	Corridor	Pollinator	Spacing		
Cucumber-Tree (<i>Magnolia acuminata</i>)	W.D. - M.W.D.	Intolerant	40 ft	100 ft			X		8-12 ft		Beautiful native tree common throughout WV. Minimal wildlife value. Sometimes used as an ornamental and timber species.
Dogwood, Flowering (<i>Cornus florida</i>)	W.D. - S.P.D.	Tolerant	20 ft	30 ft	X	X	X		4-8 ft		Berries eaten by songbirds, grouse, turkey, quail, squirrels; browsed by deer, rabbits; often used as an ornamental, <u>dogwood anthracnose can be a problem</u>
Hackberry (<i>Celtis occidentalis</i>)	W.D. - S.P.D.	Intermed.	40 ft	70 ft	X		X		8-12 ft		Birds use the mature trees for nesting sites and feed on the fruit. Young stands also provide shelter for game birds and rabbits.
Hemlock, Eastern (<i>Tsuga canadensis</i>)	W.D. - S.P.D.	Tolerant	20 ft	100 ft		X	X		8-12 ft		This tree is versatile as a hedge, large timber species, screen and wildlife tree. Native and attractive. <u>Hemlock Woolly Adelgid is becoming an increasing problem.</u>
Hickory, Shagbark (<i>Carya ovata</i>)	W.D. - M.W.D.	Intermed.	15 ft	90 ft	X		X		8-12 ft	20 X 20 ft	Develops deep taproot in the first few years. Needs deep alluvial soils. Slow growing. Excellent nut producer. Some timber value. Important for some species of bats.
Hickory, Shellbark (<i>Carya laciniosa</i>)	W.D. - P.D.	Intermed.	16 ft	90 ft	X		X			20 X 20 ft	More common in floodplains; can withstand flooding for weeks; prized wood for tool handles due to strength and flexibility
Hickory, Mockernut (<i>Carya tomentosa</i>)	W.D. - S.P.D.	Intermed.	15 ft	70 ft	X		X			20 X 20 ft	Adaptable to varying amounts of moisture sites; prized lumber for furniture, flooring, tool handles and veneer. Nuts are readily used by squirrel and other wildlife.
Locust, Black (<i>Robinia pseudoacacia</i>)	W.D. - S.P.D.	Intermed.	40 ft	70 ft	X		X	X	8-12 ft	8 X 8	Easy to establish, grows rapidly; pollinator; extremely hard wood and durable; nitrogen fixing species; common use as fence posts
Maple, Red (<i>Acer rubrum</i>)	W.D. - P.D.	Intermed.	40 ft	90 ft		X	X	X	8-12 ft		Valued as native ornamental. Early blooming and important as an early pollinator for many insects. Grows in almost any condition.
Maple, Silver (<i>Acer saccharinum</i>)	M.W.D. - P.D.	Intermed.	45 ft	80 ft		X	X		8-12 ft		Important as cavity tree and somewhat important as a wildlife food source. May be disease prone and susceptible to storm damage.
Maple, Sugar (<i>Acer saccharum</i>)	W.D. - S.P.D.	Tolerant	20 ft	100 ft		X	X		8-12 ft		Important timber producer; tolerates a wide range of conditions; important for cavity nesting wildlife.
Mulberry, Red (<i>Morus rubra</i>)	W.D. - S.P.D.	Intermed.	45 ft	70 ft	X		X	X	8-12 ft		Excellent wildlife tree for a variety of species especially birds.

TREES	Soil Drainage Class ¹	Shade Tolerance ²	Height at 20 Years	Approx. Height at Maturity	Wildlife					Wood Production Spacing	Remarks
					Food	Cover	Corridor	Pollinator	Spacing		
Oak, Black (<i>Quercus velutina</i>)	W.D. - M.W.D.	Intermed.	25 ft	80 ft	X		X		8-12 ft	20 X 20 ft	Valuable timber species; marketed as other red oaks but inferior to it; yellow inner bark
Oak, Bur (<i>Quercus macrocarpa</i>)	M.W.D. – S. P. D.	Intermed.	60 ft	110 ft	X		X				Suitable substitute for green ash. Excellent source of food for many wildlife species including deer, turkeys, squirrels rabbits, raccoons and rodents. As it reaches maturity, it provides roosting, loafing, and nesting for numerous species of birds.
Oak, Chinquapin (<i>Quercus muehlenbergii</i>)	W.D. - M.W.D.	Intolerant	40 ft	80 ft	X		X		8-12 ft		Rare throughout its range. Site specific to alkaline soils and limestone outcropped areas. Good riparian species.
Oak, Northern Red (<i>Quercus rubra</i>)	W.D. - M.W.D.	Intermed.	35 ft	100 ft	X		X		8-12 ft	20 X 20 ft	One of our most important and handsome oaks. Important as a wildlife food source, timber species and ornamental.
Oak, Overcup (<i>Quercus lyrata</i>)	M.W.D. - P.D.	Intermed.	30 ft	80 ft	X		X		8-12 ft	20 X 20 ft	Often planted for timber and ornamental. Planted to improve wildlife habitat for bottomland restoration. Native to the mid-west.
Oak, Pin (<i>Quercus palustris</i>)	M.W.D. - P.D.	Intolerant	40 ft	100 ft	X		X		8-12 ft	20 X 20 ft	Adapted to wetter sites. Good mast producer and attractive ornamental. Utilized by various wildlife especially wood ducks.
Oak, Post (<i>Quercus stellata</i>)	W.D. - M.W.D.	Intermed.	25 ft	80 ft	X		X		8-12 ft	20 X 20 ft	Tolerates harsh conditions and drought. Slow growing and may be susceptible to chestnut blight. Sometimes used as an ornamental.
Oak, Shingle (<i>Quercus imbricaria</i>)	W.D. - M.W.D.	Intolerant	30 ft	45 ft	X		X		8-12 ft		Common as ornamental and shade tree; suitable for hedges, screens and windbreaks; used by pioneers for rooftop "shake" shingles; splits easily; low wildlife value
Oak, Sawtooth (<i>Quercus acutissima</i>)	W.D. - M.W.D.	Intermed.	50 ft	70 ft	X		X		15-20 ft		Wildlife oak that produces heavy amounts of small acorns attractive to many animal species. Relatively fast growing.
Oak, Swamp White (<i>Quercus bicolor</i>)	S.P.D. - P.D.	Intermed.	30 ft	100 ft	X		X		8-12 ft	20 X 20 ft	Requires moist acidic conditions. Important food for wildlife such as squirrels, duck black bear, ducks and turkey. Often hybridizes.
Oak, White (<i>Quercus alba</i>)	W.D. - M.W.D.	Intermed.	30 ft	100 ft	X		X		8-12 ft	20 X 20 ft	Extremely important for timber value; used for furniture, flooring, wine and whiskey barrels; important wildlife food source; slow growing and often difficult to establish.
Pawpaw (<i>Asimina triloba</i>)	M.W.D. - P.D.	Tolerant	30 ft	35 ft	X		X	X	4-8 ft		Site specific and often difficult to establish. Common in floodplains in the understory. Good wildlife food source.

TREES	Soil Drainage Class ¹	Shade Tolerance ²	Height at 20 Years	Approx. Height at Maturity	Wildlife					Wood Production Spacing	Remarks
					Food	Cover	Corridor	Pollinator	Spacing		
Persimmon, Common (<i>Diospyros virginiana</i>)	W.D. - S.P.D.	Intermed.	25 ft	50 ft	X		X	X	8-12 ft		Fruit eaten by many wildlife species; one of the hardest woods; slow growing and difficult to transplant.
Pine, Eastern White (<i>Pinus strobus</i>)	W.D. - S.P.D.	Intolerant	40 ft	130 ft	X	X	X		8-12 ft	6 - 8 ft	Squirrels and 16 species of songbirds have been known to eat the seed. Native pine with commercial timber and ornamental value.
Pine, Loblolly (<i>Pinus taeda</i>)	W.D. - S.P.D.	Tolerant	50 ft	100 ft	X	X	X		8-12 ft	6 - 8 ft	Important timber species. Provides some cover and browse in winter months to wildlife.
Plum, Wild (<i>Prunus americana</i>)	W.D. - M.W.D.	Intolerant	25 ft	25 ft			X	X			Good early pollinator tree/shrub and attractive. Used by a wide variety of wildlife.
Poplar, Yellow (<i>Liriodendron tulipifera</i>)	M.W.D. - S.P.D.	Intolerant	50 ft	120+ ft	X	X	X	X	10-15 ft	10 X 10	Fast growing; attractive ornamental but very large; important timber species; provides some secondary wildlife food.
Redbud, Eastern (<i>Cercis canadensis</i>)	W.D. - S.P.D.	Tolerant	16 ft	16 ft	X		X	X	5-8 ft		Many birds, including bobwhite quail, eat the seeds. Honeybees use the blossoms. Often planted as an ornamental.
Serviceberry, Common (<i>Amelanchier arborea</i>)	W.D. - S.P.D.	Tolerant	20 ft	50 ft	X		X	X	8-12 ft		At least 40 bird species, rabbits, chipmunks, mice, voles, foxes, and black bears eat the fruit. Widely used as an ornamental.
Spruce, Norway (<i>Picea abies</i>)	W.D. - S.P.D.	Intermed.	35 ft	120 ft		X	X		8-12 ft		Important as a windbreak, screen and ornamental. Winter cover for some resident birds. Mourning doves utilize this tree for nesting.
Spruce, Red (<i>Picea rubens</i>)	W.D. - M.W.D.	Tolerant	25 ft	110 ft	X	X	X		8-12 ft		One of the most important timber and wildlife species in North America. Site specific above 3000 feet in eastern counties of WV
Spruce, White (<i>Picea glauca</i>)	W.D. - S.P.D.	Intermed.	30 ft	100 ft	X	X	X		8-12 ft		Important for screens, timber and ornamental. Winter cover and food for some birds. Hybridizes freely. Native to the northeast.
Sycamore, American (<i>Platanus occidentalis</i>)	M.W.D. - P.D.	Intermed.	50 ft	100 ft			X		8-12 ft		Very quick growing and large. Slow decaying leaves. Prone to disease. Found along streambanks and a variety of other sites.
Walnut, Black (<i>Juglans nigra</i>)	W.D. - M.W.D.	Intolerant	35 ft	80 ft	X		X		10-20 ft	20 X 20 ft	Prefers deep, well drained, fertile soils; important as a timber and nut crop tree; produces juglone that inhibits competition from adjacent plants; confirm Thousand Cankers Disease (TCD) spread before planting

¹ **Well Drained (W.D.):** Water is removed from the soil readily but not rapidly and available to plants most of the growing season. Wetness does not inhibit growth of roots for significant periods. **Moderately Well Drained (M.W.D.):** Water is removed from the soil somewhat slowly during some periods. These soils are wet for only short time during the growing season. They may contain a slowly pervious layer or receive periodic heavy rainfall or both. **Somewhat Poorly Drained (S.P.D.):** Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of some plants. They commonly have a slowly pervious layer or receive periodic heavy rainfall or both. **Poorly Drained (P.D.):** Water is removed so slowly that the soil remains saturated for significant portions or remains wet for long periods during the growing season. Free water is commonly at the surface. Poor drainage may result from high water tables, slowly pervious layers within the profile, seepage or any combination of these factors.

² **Intolerant:** Will not tolerate shaded conditions. **Intermediate (Intermed.):** Will tolerate partially shaded conditions. **Tolerant:** Will tolerate full shade and usually does not prefer full sun.