

Selecting Trees and Shrubs for Conservation Plantings

KANSAS FOREST SERVICE

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Right plant, right place

Successfully growing trees and shrubs in Kansas depends on the selection of appropriate plants for the intended site. Matching growing conditions and space available at the planting location with the intended suitability and functionality of each plant will determine the most suitable species to be planted.

Plant Selection

The following tables illustrate the tolerance of individual trees and shrubs to various environmental conditions as well as the growth habits and ideal utility of each species. The trees and shrubs listed here are recommended by industry professionals such as Kansas Forest Service staff, local conservation boards, wildlife professionals, USDA Natural Resource Conservation Service staff, and other research based conservation agencies. For a more extensive list of urban tree recommendations, refer to the KFS preferred tree lists located on the KFS website under community forestry resources.

Plant availability

All species listed here are typically available for purchase from the KFS Conservation Tree and Shrub program as bare root or containerized seedlings each spring and fall. Stratified seed from species which have demonstrated success from direct seeding efforts may also be available. KFS continues to assess new plant material each year to provide access to healthy, affordable seedlings which are appropriately adapted to Kansas environments.

Conservation Planning

Help with conservation plan development is available for windbreaks, riparian buffers, wildlife habitat, forest stand improvement, and other recreational, landscape, and/or ecological plantings. Contact your KFS district forester for more information (see back panel).

Using this Guide

Three tables are provided to separate deciduous trees, evergreen trees, and shrubs. Use the indicators below to assess species suitability for your planting.

- Environmental Tolerances

The left side of each chart indicates the tolerance of each species to environmental conditions including drought and flooding.

- Growth Traits and Utility

The right side of each chart includes information on growth rate, height, and spread of each species. Utility of each species for each of the following planting types is also included: windbreaks (🌲), wildlife habitat and forage (🦌), insect/pollinator habitat and/or forage (🐝), Christmas trees (🎄), and timber products (🪵).

- Suitable Locations

Regional suitability of each plant is listed according to KFS rural forestry district (Figure 1). Each plant may be listed as adapted and suitable for use (X), not adapted for use (NA), not recommended for use (NR), or suitable for use with caveats (X*).

- Native vs. Introduced

Plant origin is indicated by the color of each species name. Though a few species chosen for this list are introduced/exotic, they were included because they have not demonstrated a tendency to spread aggressively and because they may fill a specific niche where native alternatives are lacking.

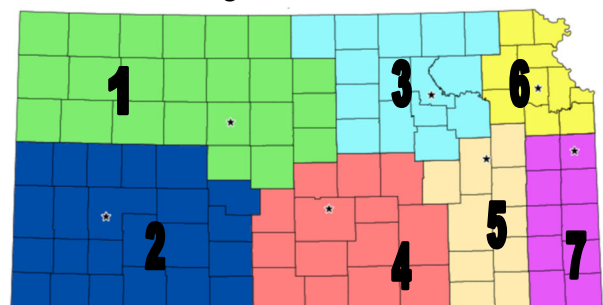



















































Figure 1: KFS Rural Forestry Districts

Shrubs

Environment		Species	KFS Rural Forestry District							Growth Traits			Function
Flood Tolerance	Drought Tolerance		1	2	3	4	5	6	7	Growth Rate	Height (ft)	Spread (ft)	
Very Low	Medium	American Plum <i>Prunus americana</i>	x	x	x	x	x	x	x	Medium	6-10	6-12	  
Very Low	High	Buffaloberry <i>Shepherdia argentea</i>	x	x	x	x	NR	NR	NR	Medium	6-12	6-12	 
High	Medium	Buttonbush <i>Cephalanthus occidentalis</i>	x	x	x	x	x	x	x	Medium	6-15	6-10	 
Low	High	Chokecherry <i>Prunus virginiana</i>	x	x	x	x	x	x	x	Fast	6-18	6-12	  
Very Low	High	Dwarf Chinkapin Oak <i>Quercus prinoides</i>	x	x	x	x	x	x	x	Slow	12-20	12-20	  
Medium	Medium	Eastern Wahoo <i>Euonymus atropurpurea</i>	NA	NA	x	x	x	x	x	Medium	20-35	20-35	 
High	Medium	Elderberry <i>Sambucus canadensis</i>	x	x	x	x	x	x	x	Fast	5-7	6-10	 
High	Medium	False Indigo <i>Amorpha fruticosa</i>	x	x	x	x	x	x	x	Medium	4-6	4-6	 
Low	High	Fourwing Saltbush <i>Atriplex canescens</i>	x	x	NR	x	NR	NR	NR	Slow	4-8	4-8	
Very Low	High	Fragrant Sumac <i>Rhus aromatica</i>	x	x	x	x	x	x	x	Medium	3-8	6-8	  
Low	Medium	Golden Currant <i>Ribes aureum</i>	x	x	x	x	x	x	x	Medium	3-5	3-5	 
Low	Medium	Hazelnut <i>Corylus americana</i>	NA	NA	x	NA	x	x	x	Fast	6-12	6-12	 
Low	High	Lilac <i>Syringa vulgaris</i>	x	x	x	x	x	x	x	Slow	8-12	6-10	 
Very Low	High	New Jersey Tea <i>Ceanothus americanus</i>	NA	NA	x	x	x	x	x	Slow	1-3	3-5	 
Low	High	New Mexico Privet <i>Forestiera neomexicana</i>	x	x	x	x	NR	NR	NR	Medium	6-8	6-8	 
Very High	Medium	Common Ninebark <i>Physocarpus orbiculatus</i>	NA	NA	x	x	x	x	x	Slow	6-12	6-12	  
Very High	Medium	Redtwig Dogwood <i>Cornus sericea</i>	x	x	x	x	x	x	x	Fast	6-12	6-12	  
Low	Medium	Rusty Blackhaw <i>Viburnum rufidulum</i>	NA	NA	x	x	x	x	x	Medium	10-20	10-20	  
Very Low	High	Sandhill Plum <i>Prunus angustifolia</i>	x	x	x	x	x	x	x	Medium	6-10	3-4	  
Medium	Medium	Serviceberry <i>Amelanchier arborea</i>	NA	NA	NA	NA	x	x	x	Medium	15-25	15-25	 
Medium	Low	Spicebush <i>Lindera benzoin</i>	NA	NA	NA	NA	NA	NA	x	Slow	6-12	6-12	 

Black = Native to Kansas

Blue = Native to USA

Red = Introduced / Exotic

Suitable for Windbreaks 

Wildlife Friendly 

Insect/Pollinator Friendly 

Wood Products 

Deciduous Trees

Environment		Species	KFS Rural Forestry District							Growth Traits			Function
Flood Tolerance	Drought Tolerance		1	2	3	4	5	6	7	Growth Rate	Height (ft)	Spread (ft)	
Low	Medium	American Hophornbeam <i>Ostrya virginiana</i>	NA	NA	NA	NA	x	x	x	Slow	20-50	15-30	
High	Medium	Baldcypress <i>Taxodium distichum</i>	x	x	x	x	x	x	x	Medium	60-100	20-30	
Low	Low	Basswood <i>Tilia americana</i>	NA	NA	x	NA	x	x	x	Medium	75-100	50-75	
Medium	Medium	Bitternut Hickory <i>Carya cordiformis</i>	NA	NA	x	x	x	x	x	Slow	50-80	50-80	
Very Low	Medium	Black Cherry <i>Prunus serotina</i>	NA	NA	x	x	x	x	x	Fast	50-80	30-50	
Very Low	Medium	Black Oak <i>Quercus velutina</i>	NA	NA	x	x	x	x	x	Medium	50-60	50-60	
Medium	Medium	Black Walnut <i>Juglans nigra</i>	x	x	x	x	x	x	x	Medium	70-90	30-40	
High	Low	Black Willow <i>Salix nigra</i>	x	x	x	x	x	x	x	Fast	30-40	30-40	
Low	High	Blackjack Oak <i>Quercus marilandica</i>	NA	NA	x	x	x	x	x	Slow	30-40	30-40	
Medium	High	Bur Oak <i>Quercus macrocarpa</i>	x	x	x	x	x	x	x	Medium	50-80	40-60	
Medium	High	Catalpa <i>Catalpa speciosa</i>	x	x	x	x	x	x	x	Fast	50-60	30-40	
Very Low	High	Chinkapin Oak <i>Quercus muehlenbergii</i>	x	x	x	x	x	x	x	Medium	30-60	20-40	
High	Medium	Cottonwood <i>Populus deltoides</i>	x	x	x	x	x	x	x	Fast	70-100	50-70	
Medium	High	English Oak <i>Quercus robur</i>	NR	x	NR	NR	NR	NR	NR	Medium	30-40	30-40	
Medium	High	Hackberry <i>Celtis occidentalis</i>	x	x	x	x	x	x	x	Fast	60-80	60-80	
Medium	High	Kentucky Coffeetree <i>Gymnocladus dioica</i>	x	x	x	x	x	x	x	Medium	75-100	50-75	
Medium	High	Lacebark Elm <i>Ulmus parvifolia</i>	NR	x	NR	NR	NR	NR	NR	Fast	35-40	30-35	
Low	Medium	Northern Red Oak <i>Quercus rubra</i>	NA	NA	x	x	x	x	x	Medium	50-75	40-60	
Medium	High	Osage Orange <i>Maclura pomifera</i>	x ¹	x ¹	x ¹	x ¹	x ¹	x ¹	x ¹	Medium	30-50	30-50	
Low	Low	Paw Paw <i>Asimina triloba</i>	NA	NA	x	x	x	x	x	Medium	15-30	20-30	
Medium	Medium	Pecan <i>Carya illinoensis</i>	NA	NA	x	x	x	x	x	Slow	80-100	75-100	

¹ Osage orange (hedge) can spread aggressively in rangeland and grassland. Post-planting grassland management strategies to minimize spread are strongly encouraged.

Deciduous Trees (continued)

Environment		Species	KFS Rural Forestry District							Growth Traits			Function
Flood Tolerance	Drought Tolerance		1	2	3	4	5	6	7	Growth Rate	Height (ft)	Spread (ft)	
Medium	Medium	Persimmon <i>Diospyros virginiana</i>	x	NA	x	x	x	x	x	Medium	20-60	20-40	
Very High	Medium	Pin Oak <i>Quercus palustris</i>	NA	NA	NA	x	x	x	x	Fast	60-70	20-40	
High	High	Post Oak <i>Quercus stellata</i>	NA	NA	NA	NA	x	x	x	Slow	40-50	30-40	
Medium	High	Red Mulberry <i>Morus rubra</i>	x	x	x	x	x	x	x	Medium	30-50	30-50	
Medium	Medium	Redbud <i>Cercis canadensis</i>	x	x	x	x	x	x	x	Medium	10-20	15-20	
Very High	Low	Sandbar Willow <i>Salix interior</i>	x	x	x	x	x	x	x	Fast	15-20	15-20	
Low	Medium	Shagbark Hickory <i>Carya ovata</i>	NA	NA	x	NA	x	x	x	Medium	65-90	35-50	
Medium	Medium	Shellbark Hickory <i>Carya laciniosa</i>	NA	NA	NA	NA	x	x	x	Slow	60-100	35-50	
Medium	Medium	Shumard Oak <i>Quercus shumardii</i>	NA	NA	x	x	x	x	x	Medium	60-80	35-50	
High	Medium	Silver Maple <i>Acer saccharinum</i>	NA	NA	x	x	x	x	x	Fast	70-80	50-60	
High	Medium	Swamp White Oak <i>Quercus bicolor</i>	x	x	x	x	x	x	x	Fast	50-70	40-60	
Medium	Medium	Sycamore <i>Platanus occidentalis</i>	x	x	x	x	x	x	x	Fast	75-100	75-100	
Low	High	Western Soapberry <i>Sapindus drummondii</i>	x	x	x	x	x	x	x	Medium	18-28	18-28	
Low	Medium	White Oak <i>Quercus alba</i>	NA	NA	x	NA	x	x	x	Slow	60-80	60-80	

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Suitable for Windbreaks Wildlife Friendly Insect/Pollinator Friendly Wood Products

Site Considerations


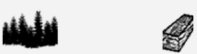






Site specific characteristics such as soil texture and pH, irrigation needs, herbicide tolerance, disease and pest pressure, climate, and planned maintenance practices should be considered when determining suitable species selection. Many of these variables (pH, climate, disease and pest pressure) are included in these tables via KFS district suitability, though not every planting site and situation may be represented. For unusually high or low soil pH, sandy textures, ornamental plantings, or for locations which may not allow for irrigation, consult your district forester (see back panel).


Fruit Trees

Interested in establishing fruit or nut orchards? Unique cultivars selected for optimal fruit production are not offered through the KFS Conservation Tree Program. Most of our planting stock is composed of seedlings (grown from seed) which (unlike specific cultivars) are genetically variable. Consult with K-State Research and Extension—Horticulture for information on selection, purchasing availability, planting, pruning, and maintenance.

Publications on fruit and nut trees can be found online at <https://hnr.k-state.edu/extension/publications>

Evergreen Trees

Environment		Species	KFS Rural Forestry District							Growth Traits			Function
Flood Tolerance	Drought Tolerance		1	2	3	4	5	6	7	Growth Rate	Height (ft)	Spread (ft)	
Low	Low	Black Hills Spruce <i>Picea glauca 'Densata'</i>	NA	NA	x	NA	NA	x	NA	Slow	40-50	10-20	
Low	High	Eastern Redcedar¹ <i>Juniperus virginiana</i>	x ¹	x ¹	x ¹	x ¹	x ¹	x ¹	x ¹	Medium	30-35	12-15	
Low	Low	Eastern White Pine*⁴ <i>Pinus strobus</i>	NA	NA	NA	NA	x*	x*	x*	High	50-80	20-30	
Medium	Medium	Oriental Arborvitae <i>Platyclusus orientalis</i>	x	NS	x	x	x	x	x	Fast	15-30	12-15	
Very Low	High	Pinyon Pine* <i>Pinus edulis</i>	NA	x*	NA	x*	NA	NA	NA	Slow	25-50	20-40	
Low	High	Ponderosa Pine*³ <i>Pinus ponderosa</i>	x*	x*	x*	x*	x*	x*	x*	Medium	40-50	20-25	
Very Low	High	Rocky Mountain Juniper² <i>Juniperus scopulorum</i>	x*	x*	NA	NA	NA	NA	NA	Medium	20-30	8-12	
Very Low	High	Southwestern White Pine* <i>Pinus strobiformis</i>	x*	x*	x*	x*	x*	x*	x*	Medium	35-50	25-40	

 = Species suitable for planting in Christmas tree farms

*Pesky Pines

Kansas is one of few states without a native pine tree species. All pines listed above are native to the USA, though some may not be adapted to every Kansas site. High pH soils, pest pressure, and “Kansas climate” which is often too dry, wet, hot, and/or cold (sometimes all in the same day) can severely stress maturing pines, causing high potential for loss of function and mortality. Specific considerations for each pine are listed below.

Though not currently problematic for the pines included above, uncertainties with regard to future susceptibility of the pine wilt disease warrant judicious use of all pine species in windbreaks.

³Ponderosa Pine

Ponderosa pine is susceptible to a variety of pests (wildlife browse, Zimmerman Pine Moth, Nantucket Pine Tip Moth) and diseases (Dothistroma needle blight, Diplodia tip blight) and tends to lose lower limbs as it matures. If chosen for windbreak purposes, fungicide applications and planting supplemental rows of shrubs for lower level wind protection will be necessary to maintain a functional windbreak.

⁴Eastern White Pine

Eastern White Pine is poorly adapted to the high pH soils and wind experienced in many parts of Kansas. On lower pH sites, EWP may be used for interior rows of multi-row windbreaks where wind intensity is reduced.

Other Evergreen Considerations

Struggles presented by Kansas site conditions limit the list of suitable evergreen species for planting. See below for information on other evergreens listed in the chart above.

¹Eastern Red Cedar

Eastern red cedar is a valuable component of windbreaks. However, to reduce potential encroachment into sensitive grassland habitats, ERC should only be recommended for windbreak plantings where suitable alternatives are not available. Integrated forestry and grassland management plans are encouraged to treat ERC escape.

²Rocky Mountain Juniper

Rocky Mountain Juniper is sensitive to humidity and requires low minimum temperatures. For greater longevity, RMJ should only be planted within 75 miles of the Kansas-Colorado border.

References and Relevant KFS Publications

KFS Publications

- Bomberger, K. 'Preferred Trees for Northeast Kansas'. 2018.
 Bruton, D. 'Marketing Kansas Timber'. C542. 2018.
 Griffin, J. and McDonnell, T. 'Conifer Trees for Kansas: A Guide to Landscape Evergreens'. MF3423. 2018.
 Klempa, J. 'Preferred Trees for Southwest Kansas'. 2010.
 McDonnell, T. 'Preferred Trees for Southcentral Kansas'. 2016.
 Rhodes, T. and Mitchener, M. 'Forest Management for Wildlife'. MF2899. 2009.
 Robinson-Clemons, C. 'Managing Your Woodland for Firewood'. MF773. 2008.
 Seirer, J. 'Preferred Trees for Northwest Kansas'. 2016
 Strine, J. 'Windbreaks for Kansas'. MF2120. 2004.

Other References

- Boyer, C. 'Deciduous Shrubs for Kansas'. 2014.
 Chapman, R., Sudkamp, S., and Pierce II, R.A. 'Quail Friendly Plants of the Midwest'. 2008. University of Missouri Extension.
 Flora of the Great Plains. Great Plains Flora Association. 1986. University Press of Kansas.
 Haddock, M. and Freeman, C. 'Trees, Shrubs, and Woody Vines in Kansas'. 2019. University Press of Kansas.

- Hightshoe, G.L. 'Native Trees, Shrubs and Vines for Urban and Rural America: A Planting Design Manual for Environmental Designers'. 1988. John Wiley and Sons, Inc.
 Hillock, D., Rebeck, K., and Schnelle, M. 'Selecting Shrubs for the Landscape'. 2018. Oklahoma Cooperative Extension Service.
 Hilty, J. 'Illinois Wildflowers'. www.illinoiswildflowers.info
 Janke, A. 'Windbreaks for Wildlife'. 2016. Iowa State University Extension and Outreach
 Ladybird Johnson Wildflower Center. University of Texas Austin. http://www.wildflower.org/plants-main
 PLANTS Database (http://plants.usda.gov, 26 January 2021).
 USDA, NRCS. 2021. National Plant Data Team, Greensboro, NC 27401-4901 USA.
 Ranking Lepidopteran Use of Native versus Introduced Plants. Society for Conservation Biology. Vol. 23 No. 4 (Aug., 2009), pp. 941-947
 Slusher, J.P. and Wallace, D. 'Planning Tree Windbreaks in Missouri'. 1997. University of Missouri Columbia Extension.
 Wilson, J.S. 'Windbreak Design'. 2004. University of Nebraska-Lincoln Extension.
 Xerces Society. www.xerces.org.

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