



United States Department of Agriculture

# Biology Technical Note #4

Natural Resources Conservation Service - Indiana - November 2016

## Upland Wildlife Habitat Management

### PURPOSE

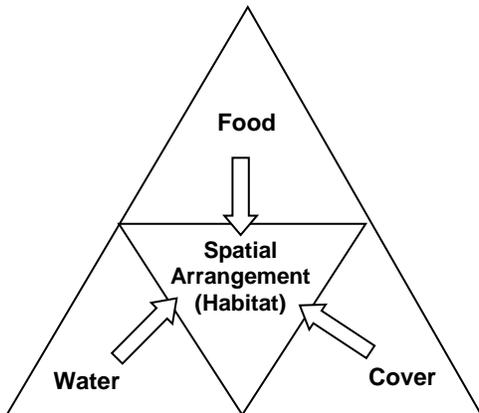
Upland Wildlife Habitat Management creates or enhances wildlife habitat by providing food, water and/or cover. Habitat management can also reduce soil erosion and improve water quality.

### WHERE PRACTICE APPLIES

This practice can be applied on land where the decision maker's objective is to conserve wildlife in general, to target a particular wildlife species, or to create/restore a specific wildlife habitat. The land must be capable of supporting the desired wildlife or habitat.



### PLANNING CONSIDERATIONS



- Consider the landowner's long-term objectives and goals. See Purdue's *Assessing Your Land's Potential for Wildlife (FNR-175-W)*.
- Identify the primary species of concern (i.e. the target wildlife) or the specific wildlife habitat.
- Consider the biological requirements for the target wildlife. Include the optimum spatial arrangement of food, water and cover.
- Determine which of the biological requirements (food, water, cover and/or arrangement) is limiting for the targeted wildlife species.
- Select appropriate plant species to address the identified limiting factors. Choose non-forage grass ecotypes when possible. Also use the appropriate tables below for forbs, trees and shrubs that are beneficial to specific wildlife and pollinators.
- Wildlife areas should not be used for travel lanes or other uses that could damage or destroy the habitat.
- Confirm that the selected plant species are adapted to the soils and moisture conditions on the site. Because they have evolved with local wildlife, use native plant species whenever possible.
- Evaluate whether a supplemental management plan is needed to control invasive plant species that may threaten plant establishment and long term viability of the project.
- Encourage habitat for pollinators by using season-long (i.e., spring, summer and fall) nectar-producing plants in non-cropped areas such as field borders, vegetative barriers, contour buffer strips, waterways, shelterbelts, windbreaks, and riparian forest and herbaceous buffers.
- Consider developing wildlife management plans with assistance from an Indiana Department of Natural Resources (IDNR) District Wildlife Biologist, US Fish & Wildlife Service (FWS) Biologist, or Farm Bill Wildlife Biologist. Planners should seek assistance for plans addressing the needs of multiple wildlife species.

## WILDLIFE HABITAT PLAN REQUIREMENTS

Follow the guidance in the [IN FOTG Standard \(645\) Upland Wildlife Habitat Management Establishment](#) for all Wildlife Habitat Development Plans.

Include the following items in the Wildlife Habitat Development Plan:

- The primary species of concern (as determined by land user), or the specific wildlife habitat to be created/restored.
- The habitat limitations for the target species and how those limitations will be addressed (see triangle diagram above).
- A plan view/map of the project site indicating all habitat types and amounts. Plant the selected grasses, forbs, legumes, trees and shrubs in blocks or strips best suited for the target wildlife species, or for the specific wildlife habitat to be created/restored.
- A list of the plant species and seeding/planting rates for all habitat elements to be established. Use the Indiana (IN) Natural Resources Conservation Service (NRCS) [Seeding Calculator](#) to determine appropriate species and seeding rates. The calculator can be found under the *Tools* tab of *Section IV* of the [IN Field Office Technical Guide \(FOTG\)](#)
- Other information pertinent to habitat establishment or management of the target species.

Follow the [Indiana Seeding Guidelines](#) for directions on the establishment of herbaceous vegetation. The guidelines can be found under the *Tools* tab of *Section IV* of the [Indiana \(IN\) Field Office Technical Guide \(FOTG\)](#).

If food plots are needed, use [645 - Upland Wildlife Habitat Management - Wildlife Food Plot Job Sheet](#).

If early successional forest or shrub habitat is desired, follow the practices found in the [IN FOTG Standard \(647\) – Early Successional Habitat Development/Management](#).

It is important to schedule disturbance activities on **grassland areas** to ensure plant diversity, maintain early successional composition, and protect soil and water resources. Management activities that will ensure these benefits include prescribed burning (according to an approved burn plan), strip disking, strip spraying, and inter-seeding of legumes. All management activities should be performed according to NRCS Standards and Specifications as found in [IN FOTG Standard \(647\) Early Successional Habitat Development](#) and appropriate job sheets.

**Tree and shrub** selection and planting density will be based on the requirements of the target wildlife species. Appropriate tree and shrub species will be selected from the Appendix of this document or the [Indiana NRCS Seeding Calculator](#).

## REFERENCES

- Davies-Adams, Laurie and Stritch, Larry Ph.D., [Selecting Plants for Pollinators for Eastern Broadleaf Forest](#), The Pollinator Partnership™/North American Pollinator Protection Campaign, San Francisco, CA.
- Langell G., Montgomery B., Stonebraker R. August 1998. [Establishing Warm-Season Grasses in Indiana](#), IDNR Division of Fish & Wildlife.
- Martin, A.C., H.S. Zim, and A.L. Nelson. 1951. *American Wildlife and Plants: A Guide to Wildlife Food Habits*, Dover, New York.
- Smith, D. D. Williams, G. Houseal, K. Henderson. 2010. *The Tallgrass Prairie Center Guide to Prairie Restoration in the Upper Midwest*, University of Iowa Press, Iowa City.

### ***Helping People Help the Land***

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## Appendix

### Quick Reference Habitat Notes

Species of Management Concern	Life History Needs
<b>GAME SPECIES</b>	
White-tailed Deer	<ul style="list-style-type: none"> <li>• Mix of woodlands, open cover, edge habitat, etc.</li> <li>• Variable forage including young twigs, grasses, grains, legumes, hard and soft-mast. Generally 80% forbs and legumes in summer, 70% hardmast in fall/winter.</li> <li>• In the spring, fawning cover, such as standing grass, densely vegetated woods, shrub cover. Hay fields can be problematic in spring due to presence of fawns during May &amp; June. Delay first cut or use a flush bar.</li> <li>• Protect saplings and shrubs from browse and rubbing in high density areas.</li> </ul>
Fox & Gray Squirrel	<ul style="list-style-type: none"> <li>• Feed on hard mast such as acorns, hickory nuts, walnuts, and beech nuts. Also use spruce cones. Cache nuts for winter storage.</li> <li>• Also use soft mast when in season, including blackgum, mulberry, dogwood, black cherry, maple samaras, wild grapes, etc.</li> <li>• Hollow trees important for nesting and cover.</li> </ul>
Eastern Cottontail	<ul style="list-style-type: none"> <li>• Requires shrubby edge habitat with plenty of dense escape cover near food source. Dense shrubs, brush piles, native cane fruit (ex- blackberry, black raspberry) all make good escape and nesting cover.</li> <li>• Feeds on tender herbaceous plants during growing season, including grasses, legumes, and forbs, as well as soft mast and grain crops.</li> <li>• Will feed on young twigs and bark in winter, causing potential damage to tree and shrub seedlings.</li> </ul>
Northern Bobwhite	<ul style="list-style-type: none"> <li>• Requires shrubby edge habitat with easy access to escape cover and grassland areas (see Eastern cottontail above).</li> <li>• Prefers native bunch grasses with overhead cover for ease of mobility, foraging, brood protection, and nesting cover. Rank grasses and sod reduce mobility and foraging efficiency by reducing access to bare ground.</li> <li>• Regular disturbance (every 3-5 years), such as prescribed grazing, prescribed fire, disking, and/or inter-seeding of forbs, is needed.</li> <li>• A mix of forbs and legumes should be planted to provide seed as a food source, and to attract insects. Locating cover near grain crops can also be beneficial. Annual weeds common in fallow fields, such as ragweed, foxtail, panicgrass, etc. provide a good source of food.</li> </ul>
Ring-necked Pheasant	<ul style="list-style-type: none"> <li>• Primarily use native tallgrass areas, hayfields, fallow fields, and occasionally shrubby edges, and cattail/shrubby wetlands.</li> <li>• Prefers native bunch grasses with overhead cover for access to the ground, brood protection, foraging areas. Rank grasses and sod reduce mobility and foraging efficiency. Regular disturbance is needed to maintain habitat.</li> <li>• Planting a mix of forbs and legumes provides seeds and attracts insects as food source. Annual weeds common in fallow fields provide a good source of food. Locating cover near grain crops can also be beneficial.</li> </ul>
American Woodcock	<ul style="list-style-type: none"> <li>• Dense, early-successional, regenerating hardwoods and shrubs in moist areas. Trees less than 2 inches in diameter.</li> <li>• Primarily feeds on earthworms. Access to moist, heathy soils with high earthworm populations.</li> <li>• Perform elaborate breeding rituals on established “singing-ground” at dusk in forest openings, fallow and old field areas from March through May.</li> <li>• Fallow and no-till crop fields valuable for spring and fall migration.</li> </ul>

Species of Management Concern	Life History Needs
<b>NON-GAME</b>	
Pollinators	<ul style="list-style-type: none"> <li>• Diverse mix of forbs for nectaring and feeding (pollen is an important food source in addition to nectar).</li> <li>• Flowering periods should cover entire growing season.</li> <li>• Many require specific larval plants. When possible, include larval hosts in plantings or nearby. For example host plants see <a href="#">NRCS and Wildlife Habitat Council Fish and Wildlife Habitat Management Leaflet #15: Butterflies, 2000.</a></li> <li>• Provide a buffer around target habitat to prevent drift from insecticides.</li> </ul>
Monarchs	<ul style="list-style-type: none"> <li>• Require milkweed as a larval host, particularly common milkweed.</li> <li>• In Indiana, the last generation of monarch will migrate to Mexico. Plantings should include at least 60% high value monarch nectaring plants with mid-late bloom periods to provide energy needs for the migration.</li> </ul>
Native Bees	<ul style="list-style-type: none"> <li>• Often nest in dead wood or in the ground. Areas of bare ground around bunch grasses, shrubs, etc. are important nesting locations. Standing dead or downed logs are also beneficial.</li> </ul>
Other Native Pollinators	<ul style="list-style-type: none"> <li>• Insects such as flies and beetles should not be overlooked as pollinators. Some trees, such as pawpaw, require a fly for fruit production.</li> <li>• Hummingbirds are attracted to tube-shaped flowers, with red flowers being the most highly attractive.</li> </ul>
Forest Songbirds	<ul style="list-style-type: none"> <li>• Is a diverse group of species with varying habitat needs.</li> <li>• Forest openings, such as those created through timber harvest, can serve as important foraging areas for some species.</li> <li>• Feed on insects, soft and hard mast.</li> <li>• Nest in tree tops, snags, and on ground. Keep a diversity of forest age classes, including downed logs in the managed area.</li> <li>• Forest interior birds require large forested areas (&gt; 80 acres) and may not nest near edges. Smaller woodlots will not be suitable. Forest management activities should take into consideration edge created and species of management concern.</li> </ul>
Grassland Songbirds	<ul style="list-style-type: none"> <li>• Often require bunch grasses for nesting cover, access to foraging areas, brood cover, and larger grassland areas, etc.</li> <li>• Diverse plantings of grasses, legumes and forbs, for food and to attract insects.</li> <li>• Many will not nest near structures or tall vegetation, including trees, fence posts, telephone poles, and houses due to the potential threat of predation; raptors often use these structures as perches.</li> </ul>
Bats	<ul style="list-style-type: none"> <li>• Forest bats of state conservation concern rely heavily on trees with loose bark, such as shagbark hickory, silver maple, cavity trees, and snags for roosting and brood rearing.</li> <li>• Forest bats will often not venture far into the open. Connectivity between woodlots, even along wooded fencerows and stream corridors is critical to the movement of these species.</li> </ul>
Reptiles and Amphibians	<ul style="list-style-type: none"> <li>• Upland habitat complements wetland habitat by increasing water quality and decreasing sediment and nutrient accumulation.</li> <li>• Several species use upland habitat to hunt for insects, small mammals, etc. Upland areas may also be used for hibernacula.</li> <li>• Reptiles rely on upland areas for nesting locations, typically in shallow, loose soil, ditch banks, under logs, leaf litter, and bare ground areas.</li> <li>• Moist forest litter, downed logs, is an important habitat component for several species, including salamanders and eastern box turtles.</li> </ul>

**SAMPLE GENERAL NATIVE GRASS AND LEGUME MIXES**

**Short-statured prairie**

**Benefits: Upland gamebirds, particularly quail, grassland songbirds, small mammals, pollinators (when diverse forb mix included), whitetail, etc.**

Species	Pounds PLS/ Acres
Little Bluestem	2.0
Prairie Dropseed	0.2
Sideoats grama	1.5
Showy Tick Trefoil	0.25
Minimum additional 5 forbs/legumes (8 if pollinator habitat)	½-1 lb+

**Tallgrass prairie**

**Benefits: Upland gamebirds, particularly pheasant, small mammals, pollinators (when diverse forb mix included), whitetail, etc.**

Species	Pounds PLS/ Acres
Little Bluestem	2.0
Big Bluestem	0.75
Indiangrass	0.5
Switchgrass	0.25
Purple Prairie Clover	0.25
Minimum additional 5 forbs/legumes (8 if pollinator habitat)	½-1 lb+

**Mid-statured prairie**

**Benefits: Upland gamebirds, small mammals, pollinators (when diverse forb mix included), whitetail, etc.**

Species	Pounds PLS/ Acres
Little Bluestem	2.0
Big bluestem	0.25
Sideoats grama	1.25
Canada Wildrye	1.00
Illinois Bundle flower	0.25
Minimum additional 5 forbs/legumes (8 if pollinator habitat)	½-1 lb+

**Poorly Drained (non-floodplain) soils**

**Benefits: Upland gamebirds, small mammals, pollinators (when diverse forb mix included), whitetail, etc.**

Species	Pounds PLS/ Acres
Big Bluestem	1.25
Fowl Manna Grass	0.3
Switchgrass	0.25
Riverbank Wildrye/Virginia Wildrye	2.25/1.25
Wild Senna	0.5
Minimum additional forbs/legumes (8 if pollinator habitat)	½-1 lb+

### Sample General Native Forb Mixes

#### General - Well-drained soil

**Benefits: Upland gamebirds, songbirds, beneficial insects, etc.**

Species	Ounces PLS/Acre	Bloom period
Round-headed lespedeza	2	Mid-Late
Smooth blue aster	2	Mid-Late
Foxglove Beardtongue	2	Early-Mid
Lanceleaf Coreopsis	2	Mid-Late
Sweet Black-eyed Susan	2	Late

#### General - Well-drained soil

**Benefits: Songbirds, beneficial insects, upland gamebirds, etc.**

Species	Ounces PLS/Acre	Bloom period
Round-headed lespedeza	2	Mid-Late
Common milkweed	3	Early-Late
Wild bergamot	2	Mid-Late
Purple Coneflower	2	Mid-Late
Black-eyed Susan	2	Late
Rattlesnakee master	2	Mid-Late

#### General – Poorly Drained Soil

**Benefits: Upland gamebirds, songbirds, beneficial insects, etc.**

Species	Ounces PLS/Acre	Bloom period
Foxglove Beardtongue	2	Early-Mid
Cup plant	4	Mid-Late
Bur Marigold	2	Mid-Late
New England Aster	1	Late
Swamp Milkweed	2	Early-Late

#### General Pollinator- Well-drained soil

**Benefits: Pollinators, beneficial insects, songbirds, upland gamebirds, etc.**

Species	Ounces PLS/Acre	Bloom period
Round-headed lespedeza	2	Mid-Late
Golden Alexander	1	Early
Smooth blue aster	1	Mid-Late
Purple Coneflower	2	Mid-Late
Lanceleaf Coreopsis	2	Mid-Late
Yellow Coneflower	2	Mid-Late
Sweet Black-eyed Susan	1	Late
Common Milkweed	3	Early-Late
Butterfly milkweed	2	Early-Late

#### General Pollinator- Poorly Drained soil

**Benefits: Pollinators, beneficial insects, songbirds, etc.**

Species	Ounces PLS/Acre	Bloom period
Foxglove Beardtongue	2	Early-Mid
Cup plant	3	Mid-Late
Bur Marigold	2	Mid-Late
New England Aster	1	Late
Swamp Milkweed	2	Early-Late
Dense Blazing Star	1	Mid-Late
Common milkweed	3	Early-Late
Joe Pye Weed	1	Mid-Late
Brown-eyed Susan	1	Mid-Late

**Sample Introduced Grass and Legume Mixes**

**Benefits: Bobwhite, upland game birds, beneficial insects, etc.**

Species	Pounds PLS/ Acres
Red top	0.75
Riverbank Wildrye or Virginia Wildrye	2.00
Alfalfa	1.75
Alfalfa	0.5
White Dutch clover	0.25

**Benefits: Songbirds, beneficial insects, etc.**

Species	Pounds PLS/ Acres
Timothy	0.5
Orchardgrass	2.0
Ladino Clover	0.25
Alfalfa	0.75

**Benefits: Ring-necked Pheasant, upland gamebirds, beneficial insects, etc.**

Species	Pounds PLS/ Acres
Timothy	4.5
Orchardgrass	1.0
Ladino Clover	1.0
Alfalfa	1.0

**Benefits: Eastern cottontail**

Species	Pounds PLS/ Acres
Kentucky Bluegrass	1.75
Redtop	1.00
Alfafla	0.5
Ladino Clover	0.25

**Benefits: Poorly drained soils, non-flood plain areas**

Species	Pounds PLS/ Acres
Timothy or Redtop	1.0
Riverbank Wildrye or Virginia Wildrye	0.75
Riverbank Wildrye or Virginia Wildrye	2.5
Alsike Clover	1.25
Alsike Clover	0.25
White Dutch Clover	0.25

Tree Planting Densities

Woodland Habitat Type <sup>1</sup>	Stems/Acre	Spacing	Species Benefited	Comments
<b>General Wildlife</b>	300	12 ft. x 12 ft.	Wooded-wildlife generalists (including deer, raccoons, squirrels, and songbirds).	
	436	10 ft. x 10 ft.		
<b>Early Successional</b>	300 (shrubs only)	12 ft. x 12 ft.	Willow flycatcher, Prairie warbler, Yellow breasted chat, and Yellow warbler.	Intended to maximize the length of early successional habitat development stage.
	Min. 640	Min. 8 ft. x 8 ft.	Woodcock, Ruffed Grouse, and various woodland/early successional forest songbirds.	Where cropland, located within forested settings, is planted to trees to “fill in the gaps” for forest interior birds. Intended to maximize woody stem density in a short period of time. No follow-up herbicide treatment will be used after planting.
<b>Edge Feathering</b>	300	12 ft. x 12 ft.	Rabbits, quail, turkey and songbirds.	Where soft mast-producing trees and shrubs are planted adjacent to existing woodland, as opposed to cutting back into the woodland edge to achieve the same results. See <a href="#">Feathering Wooded Edges Job Sheet</a> .
<b>Closed-canopy</b>	544	8 ft. x 10 ft.	Neotropical migratory songbirds; Copperbelly Water Snake.	Intended to have closed-canopy woody vegetation within a 10 to 20-year period.
<b>Savanna</b>	200*	12 ft. x 18 ft.*	Bluebirds, Short-eared owls, Red-headed Woodpeckers, swallows, orioles, and grassland birds, bats, and butterflies.	*See IN FOTG Standard (643) <a href="#">Restoration and Management of Declining Habitats</a> for further guidance.
<b>Natural Regeneration</b>	N/A	N/A	Turkey, Ruffed Grouse and an array of other species as succession progresses.	

<sup>1</sup> Sites with minimal or no flooding limitations

**Woody Species Value to Wildlife**  
**Native Shrubs**

Common Name Scientific Name	Soil Moisture Tolerance	Ave. Mature Height (ft.)	Wildlife Information	General Comments
Alder, Hazel <i>Alnus serrulata</i>	VPD – WD	18	Deer browse on the twigs.	Prefers wet to moist soils. Long lenticels on the stem. Rarely damaged by deer.
Arrowwood <i>Viburnum dentatum</i>	MWD - WD	9	Fruit eaten by songbirds.	Fruit ¼ inch long, bluish-black. Rarely damaged by deer.
Ash, Prickly <i>Xanthoxylum americanum</i>	SPD – WD	9	Used by Giant Swallowtail butterfly larvae.	A thicket forming shrub with prickly leafstalks. Fruit are a small reddish-brown pod.
Bayberry, Northern <i>Myrica pensylvanica</i>	SPD – WD	8	Fruit and seeds eaten by songbirds. Low, brushy stature provides concealment for ground-dwelling wildlife.	Small, grayish-silver, persistent, berries attached to main stems of plant. Not native to Indiana.
Blackberry, Wild <i>Rubus allegheniensis</i>	MWD – ED	5	Provides cover and food for birds and mammals. Recommended for quail and turkey.	Upright arching shrub with stout prickles.
Blackhaw <i>Viburnum prunifolium</i>	MWD - WD	20	Fruit eaten by songbirds, quail, fox and turkey.	Fruit ½ inch long.
Bladdernut <i>Staphylea trifolia</i>	SPD – WD	10		3-lobed balloon like capsule.
Blueberry, Dryland <i>Vaccinium pallidum</i>	WD – ED	1 – 3	Important to grouse, scarlet tanager, bluebirds, thrushes and other songbirds. Used by small mammals including chipmunks and white-footed mice.	Prefers dry, acid sandy soil.
Blueberry, Lowbush <i>Vaccinium angustifolium</i>	WD – ED	1		
Chokecherry <i>Prunus virginiana</i>	SPD – WD	18	Fruit eaten by songbirds.	Fruit ⅓” long, dark-purple.
Chokeberry, Black <i>Aronia melanocarpa</i>	SPD – WD	10	Fruit eaten by songbirds. Recommended for turkey.	Fruit ⅓” long, dark-purple. Seldom severely damaged by deer.
Coralberry <i>Symphoricarpos orbiculatus</i>	MWD - WD	5	Fruit eaten by songbirds, quail, and ruffed grouse.	Fruit coral to purple.
Crabapple, Prairie <i>Malus ioensis</i>	PD – WD	30	Fruit eaten by opossum, squirrel, raccoon and fox. Recommended for turkey.	Small fruit, showy flowers.
Crabapple, Wild Sweet <i>Malus coronaria</i>	SPD – ED	30	Recommended for quail and turkey.	Yellow-green edible fruit with highly fragrant flowers.
Cranberry, Highbush <i>Viburnum trilobum</i>	VPD – WD	9	Fruit eaten by grouse, pheasant and songbirds. Recommended for turkey.	Tart red fruit. Showy.
Devils Walking Stick <i>Aralia spinosa</i>	SPD - MWD	20	Fruit eaten by birds (favorite of thrushes).	Showy white flowers, black fruit.
Dogwood, Alternate Leaf <i>Cornus alternifolia</i>	SPD – WD	18	Fruit eaten by birds. Twigs browsed by deer and rabbits.	Blue-black fruit with red stems. Leaves not opposite.
Dogwood, Flowering <i>Cornus florida</i>	MWD - WD	30	Recommended for quail and turkey.	Showy flowers, glossy red fruit.

**Native Shrubs (continued)**

Common Name Scientific Name	Soil Moisture Tolerance	Ave. Mature Height (ft.)	Wildlife Information	General Comments
Dogwood, Gray <i>Cornus racemosa</i>	SPD – WD	8	Fruit eaten by pheasant turkey and grouse.	Red pedicles in winter, white fruit.
Dogwood, Red Osier <i>Cornus stolonifera</i>	VPD – WD	10	Fruit eaten by songbirds, grouse, quail and turkey. Twigs browsed by deer and rabbits.	Reddish stem, white fruit, good winter color. Seldom severely damaged by deer.
Dogwood, Rough Leaved <i>Cornus drummondii</i>	PD – WD	18	Fruit eaten by songbirds, grouse, quail, turkey and pheasant. Twigs browsed by rabbits and deer.	White fruit.
Dogwood, Silky <i>Cornus amomum</i>	VPD – WD	10	Sometimes browsed by rabbits and deer.	Bluish fruit, likes moist soils and partial shade.
Elderberry <i>Sambucus canadensis</i>	VPD – WD	9	Fruit eaten by many birds including pheasant and dove. Recommended for quail and turkey.	Purple-black fruit used for jams, jellies, pies, and wine. Seldom severely damaged by deer.
Hazelnut <i>Corylus americana</i>	MWD - WD	15	Small nut eaten by squirrel, deer, jays, grouse, and pheasant. Recommended for quail and turkey.	Often forms large colonies.
Huckleberry <i>Gaylussacia baccata</i>	PD - WD	1 - 3	Utilized by upland game birds, including grouse, quail and turkey, and most song birds.	Prefers acid soils. ID by yellow resin dots on back of leaves
Indigobush <i>Amorpha fruticosa</i>	VPD – WD	6		Small pods, flowers purplish spikes.
Leadplant <i>Amorpha canescens</i>	WD – ED	3		Small erect prairie shrub with purple flowers.
Nannyberry <i>Viburnum lentago</i>	SPD – WD	18	Fruit eaten by songbirds. Recommended for turkey.	Blue-black fruit similar to raisins.
New Jersey Tea <i>Ceanothus americanus</i>	WD - ED	3	Used by quail, wild turkey, and rabbits. Used by butterflies.	Prairie plant with white flower in dense heads.
Ninebark <i>Physocarpus opulifolius</i>	VPD – WD	10	Fruit are small dry bladders. Recommended for turkey.	White to pinkish flowers.
Pawpaw <i>Asimina triloba</i>	SPD – WD	20	Fruit eaten by opossum, squirrels, raccoon, and fox.	Large leaves, likes deep moist soils. Rarely damaged by deer.
Plum, American <i>Prunus americana</i>	MWD – ED	30	Fruit eaten by songbirds, many mammals including small rodents. Recommended for quail and turkey.	Reddish fruit.
Raspberry, Wild <i>Rubus occidentalis</i>	MWD – WD	5	Provides cover and food for birds and mammals. Recommended for quail and turkey.	Arching shrub with strong hooked prickles.
Redbud <i>Cercis canadensis</i>	MWD – WD	30	Seeds eaten by a few songbirds.	A legume, 2-3” pod, reddish-purple flowers, heart shaped leaves.
St. Johnswort, Shrubby <i>Hypericum prolificum</i>	SPD – WD	6		Bright yellow flowers, 3-valved capsule.
Spicebush <i>Lindera benzoin</i>	VPD – WD	9	Twigs and fruit eaten by songbirds, grouse, rabbit, opossum, quail and deer. Recommended for turkey.	Small red fruit. Rarely damaged by deer.
Spirea <i>Spiraea alba</i> <i>Spiraea tomentosa</i>	VPD – WD	4	Buds eaten by ruffed grouse. Twigs browsed by deer and rabbits.	Pink flowers. Also called Meadowsweet or Hardack.

**Native Shrubs (continued)**

Common Name Scientific Name	Soil Moisture Tolerance	Ave. Mature Height (ft.)	Wildlife Information	General Comments
Sumac, Shining (a.k.a. Dwarf) <i>Rhus copallina</i>	MWD – ED	8	Fruit eaten by songbirds, quail, dove, pheasant. Recommended for turkey. Used by native pollinators.	Reddish fruit. Tolerates dry, infertile soils.
Sumac, Smooth <i>Rhus glabra</i>	MWD – ED	12	Twigs and fruit eaten by songbirds, pheasant, and dove. Recommended for quail and turkey.	Often forms large colonies. Reddish fruit.
Sumac, Staghorn <i>Rhus typhina</i>	MWD – ED	15	Fruit eaten by songbirds, quail, dove, pheasant. Twigs browsed by rabbits and deer. Recommended for turkey.	Tolerates dry, infertile soils. Reddish fruit.
Wahoo, Eastern <i>Euonymus atropurpureus</i>	SPD – WD	12	Fruit eaten by birds.	4-lobed red capsule, sometimes winged stem.
Willow, Prairie <i>Salix humilis</i>	PD – SPD	13	Use where prairie requires woody vegetation for the targeted species, such as perches for Dickcissels.	Recommended for prairie restorations. Flowers from late April through mid May.
Winterberry <i>Ilex verticillata</i>	VPD – WD	15	Buds and twigs browsed by deer and rabbits.	Provides a bright red ¼” fruit in fall that persists after leaf drop. Prefers moist acid soil conditions. Male and female plants are needed for fruit production.
Witch-hazel <i>Hamamelis virginiana</i>	SPD – WD	18	Seeds, buds and twigs eaten by deer, rabbit, quail and pheasant.	Pale yellow flowers that produce seedpods.

**Conifers**

Common Name Scientific Name	Soil Moisture Tolerance	Ave. Mature Height (ft.)	Wildlife Information	General Comments
Baldcypress <i>Taxodium distichum</i>	VPD – WD	80	Waterfowl occasionally consume seeds. Trees also serve as perching areas for song and wading birds.	Baldcypress is 1 of 2 deciduous conifer trees native to Indiana. Very flood tolerant.
Cedar, Eastern Red <i>Juniperus virginiana</i>	SPD – ED	45	Berries consumed by songbirds. Recommended for turkey.	Small coniferous tree tolerant of dry, sterile soils.
Cedar, Northern White <i>Thuja occidentalis</i>	PD – WD	40	Foliage often browsed by deer in late winter as an emergency food source. Recommended for turkey.	A medium sized evergreen once common in northern Indiana bogs. Attains best form on calcareous soils. Common ornamental.
Hemlock, Eastern <i>Tsuga canadensis</i>	SPD - WD	70	The dense low foliage of young plants makes good winter cover for grouse, turkey, deer, and other wildlife. Excellent nesting habitat. Small winged seeds fed on by chickadees, pine siskins, crossbills, and red squirrels; twigs browsed by deer, and rabbits.	Hemlocks prefer a moist, well-drained, slightly acid soil with protection from heat, drought and wind.
Pine, Eastern White <i>Pinus strobus</i>	MWD – WD	90	Pines make excellent roosting trees for many species of birds. Seeds are eaten by a wide variety of birds, squirrels and mice. Recommended for turkey.	Large tree capable of attaining heights over 200 feet under ideal conditions. Bluish-green needles grow in groups of 5. Native only in a few spots in the west-central portion of the state.

**Conifers (continued)**

Common Name Scientific Name	Soil Moisture Tolerance	Ave. Mature Height (ft.)	Wildlife Information	General Comments
Pine, Jack <i>Pinus banksiana</i>	WD - ED	40	Pines make excellent roosting trees for many species of birds. Seeds are eaten by a wide variety of birds, squirrels and mice. Recommended for turkey.	Plant in northern Indiana only. Has serotinous cones that open to release seeds from forest fires. Tolerates dry acid soil conditions.
Pine, Red <i>Pinus resinosa Ait.</i>	MWD - ED	40		Plant in central and northern Indiana only. Seldom severely damaged by deer.
Pine, Virginia <i>Pinus virginiana</i>	MWD - ED	40		Small sized tree with needle in-groups of two. Cones bear sharp prickles.
Norway Spruce	SPD - WD	60	A non-native to Indiana, but may be used in cases where severe deer problems exist.	A dense conifer with spiral-arranged linear, green, flattened leaves.

**Non-mast Producing Trees**

Common Name Scientific Name	Soil Moisture Tolerance	Ave. Mature Height (ft.)	Wildlife Information	General Comments
Aspen, Bigtooth <i>Populus grandidentata</i>	MWD - WD	70	Twigs and bark consumed by deer and beavers. Buds and catkins eaten by ruffed grouse.	Medium sized tree with olive-gray bark which becomes furrowed on older trees. Rarely damaged by deer.
Cottonwood, Eastern <i>Populus deltoides</i>	PD - ED	90	Recommended for turkey.	Large tree typical of riverbanks. The triangle shaped (deltoid) leaves give this tree its name.
Sycamore, American <i>Platanus occidentalis</i>	PD - WD	90	While sycamore has low food value to most wildlife, this species forms an important structural component of bottomlands and floodplains.	The sycamore has multicolored bark and is one of our largest trees. It is capable of attaining heights of over 100 feet.

**Soft Mast Producing Trees**

Common Name Scientific Name	Soil Moisture Tolerance	Ave. Mature Height (ft.)	Wildlife Information	General Comments
Birch, River <i>Betula nigra</i>	VPD - WD	50	Stands of birch serve as important cover for riparian dwelling animals.	Small to medium sized tree of floodplains. Has Cinnamon colored, exfoliating bark.
Cherry, Black <i>Prunus serotina</i>	MWD - WD	70	Familiar fruit eaten by many species of songbirds, ruffed grouse and pheasant. Recommended for turkey.	Tall tree of well drained soils. Valuable timber species that produces white blossoms and edible fruit.
Gum, Black <i>Nyssa sylvatica</i>	PD - WD	60	Fruit consumed by songbirds, and Pileated woodpeckers. Recommended for turkey.	Medium sized tree, which thrives in both upland and wetland conditions. Foliage turns a red color in fall.
Hackberry <i>Celtis occidentalis</i>	SPD - WD	50	Fruit sparingly eaten by songbirds, including cedar waxwings, and robins during winter. Recommended for turkey.	Small to medium sized tree of calcareous soils and floodplains. Taste of the fruit similar to dates, but contain a large seed.

**Soft Mast Producing Trees (continued)**

<b>Common Name Scientific Name</b>	<b>Soil Moisture Tolerance</b>	<b>Ave. Mature Height (ft.)</b>	<b>Wildlife Information</b>	<b>General Comments</b>
Hawthorn, Cockspur <i>Crataegus crus-galli</i>	SPD - ED	30	Fruit are important winter food source for many songbirds including ruffed grouse. Fruit eaten by deer, fox, rabbit, pheasant and turkey. Excellent nesting habitat for songbirds.	Large shrubs or small trees that usually bear stout spines. White flowers yield small, apple like fruit. Common in disturbed woodlands that had previously been pasture. Rarely damaged by deer.
Hawthorn, Green <i>Crataegus viridis</i>	SPD - ED	30		
Hawthorn, Washington <i>Crataegus phaenopyrum</i>	SPD - ED	30		
Kentucky Coffeetree <i>Gymnocladus dioicus</i>	SPD – WD	50	Fruit relished by squirrels, opossum, raccoon and songbirds.	Uncommon, medium sized tree with gray, scaly bark. Fruit a thick, brown pod.
Maple, Black <i>Acer nigrum</i>	MWD – WD	70	Samaras are widely consumed by birds and squirrels. Browsed by deer. Recommended for turkey.	Similar to sugar maple, but with leaves 3-lobed and darker green on top.
Maple, Red <i>Acer rubrum</i>	VPD – WD	70		Medium sized tree of swampy areas, but also found in upland conditions. Leaves scarlet red in fall.
Maple, Silver <i>Acer saccharinum</i>	VPD – WD	80		Very fast growing medium sized tree of floodplains and poorly drained soils. Small yellow (female) and reddish (male) flowers appear very early in the spring.
Maple, Sugar <i>Acer saccharum</i>	MWD – WD	70		One of the most common medium sized trees of well-drained woodlands. Five-lobed leaves turn a brilliant yellow-orange in fall.
Persimmon <i>Diospyros virginiana</i>	MWD – WD	50	Raccoons as well as some songbirds readily consume large berries.	Small tree found in bottomlands and old fields. Fruit, a large berry, is edible when ripe.
Sassafras <i>Sassafras albidum</i>	SPD - ED	40	Browsed by deer, rabbits, beaver, fox squirrel and woodchuck. Fruit eaten by raccoons, squirrels, woodchucks and songbirds. Recommended for quail.	Fruit an oblong, bluish black fruit about 1/4" long. Good fence row cover. Re-sprouts if cut. Roots can be brewed to make tea. Seldom severely damaged by deer.
Serviceberry <i>Amelanchier arborea</i>	MWD – WD	30	Purplish fruit rapidly consumed by birds. Recommended for turkey.	Small, uncommon tree of well drained woodlands. Flowers are white and appear in April. This tree is also known as Juneberry because the fruit usually ripens in early summer. Seldom severely damaged by deer.
Sweetgum <i>Liquidambar styraciflua</i>	PD – WD	85	Seeds consumed by finches in winter.	Large tree common in bottomlands of southern Indiana. Fruit is a prickly ball with multiple capsules.
Tuliptree <i>Liriodendron tulipifera</i>	MWD – WD	90	Seeds eaten by songbirds, squirrels, quail and turkey.	Common, large sized tree is a member of the magnolia family. Fruit are upright, which remain on the twigs through winter.

### Hard Mast Producing Trees

Common Name Scientific Name	Soil Moisture Tolerance	Ave. Mature Height (ft.)	Wildlife Information	General Comments
Beech, American <i>Fagus grandifolia</i>	MWD – WD	75	Nuts consumed by deer, and squirrels. Recommended for turkey.	Extremely shade tolerant species with decorative smooth gray bark. Rarely damaged by deer.
Buckeye, Ohio <i>Aesculus glabra</i>	SPD – WD	60	Nuts sparingly consumed by eastern fox squirrels.	Fast growing species. Twigs poisonous to livestock.
Butternut <i>Juglans cinerea</i>	MWD – WD	50	Elliptical nuts consumed by squirrels.	Small to medium sized tree with gray furrowed bark. Uncommon.
Hickory, Bitternut <i>Carya cordiformis</i>	SPD – WD	50	The nuts of these species constitute an important food source for squirrels and Wood ducks. Recommended for turkey.	Medium sized tree of moist woodlands. Winter buds are sulfur-yellow. The common name is derived from the bitter taste of the nut.
Hickory, Mockernut <i>Carya tomentosa</i>	MWD - ED	50	The nuts of these species constitute an important food source for squirrels and Wood ducks Recommended for turkey.	Small to medium sized hickory whose name is derived from the small size of the sweet kernel, relative to the overall size of the nut.
Hickory, Pignut <i>Carya glabra</i>	WD – ED	50		Medium sized tree.
Hickory, Shagbark <i>Carya ovata</i>	MWD – WD	70	The loose shaggy bark makes excellent bat roosting sites. Recommended for turkey.	Medium sized tree typical of well-drained soils throughout Indiana.
Oak, Black <i>Quercus velutina</i>	MWD – ED	60	Acorns from oaks are perhaps the most important food source for a variety of wildlife including woodpeckers, squirrels, and deer. Recommended for turkey.	Medium sized tree of well drained to dry soils. Bark is black and blocky.
Oak, Bur <i>Quercus macrocarpa</i>	PD – ED	80		Medium to large sized tree. Grows most typically in mesic woodlands and along floodplains, but is also very drought and fire tolerant. Large acorns with fringed caps.
Oak, Cherrybark <i>Quercus pagoda</i>	SPD – WD	75		Large tree of bottomlands and well-drained soils. Found only in the extreme southwestern part of Indiana.
Oak, Chinquapin <i>Quercus muhlenbergii</i>	MWD – ED	60		Small to medium sized tree of calcareous soils and well-drained bottomlands. Bark is scaly with a yellowish cast.
Oak, Pin <i>Quercus palustris</i>	VPD – WD	75		The smaller pin oak acorns are particularly favored by wood ducks.
Oak, Red <i>Quercus rubra</i>	MWD – WD	80		Common medium to large sized tree of mesic woodlands. Bark is blocky at the base of old trees while the upper portion of the trunk resembles “ski tracks”.

**Hard Mast Producing Trees (continued)**

Common Name Scientific Name	Soil Moisture Tolerance	Ave. Mature Height (ft.)	Wildlife Information	General Comments
Oak, Scarlet <i>Quercus coccinea</i>	MWD – ED	70	Acorns from oaks are perhaps the most important food source for a variety of wildlife including woodpeckers, squirrels, and deer. Recommended for turkey.	Medium sized tree of dry ridges. Leaves turn a brilliant scarlet in autumn.
Oak, Shingle <i>Quercus imbricaria</i>	SPD – WD	50		Small to medium sized tree of mesic woodlands. Leaves remain through winter. Uncharacteristically, leaves of this species are not lobed.
Oak, Shumard <i>Quercus shumardii</i>	SPD – WD	75		Large tree of well-drained soils and bottomlands. Closely resembles red oak, but usually occurs lower on the landscape.
Oak, Swamp Chestnut <i>Quercus michauxii</i>	SPD – WD	70		Medium to large tree of poorly drained soils. Bark may be confused with that of white oak, but has coarsely serrate margined leaves.
Oak, Swamp White <i>Quercus bicolor</i>	VPD – WD	70		Medium sized tree of poorly drained soils. The specific name, bicolor, refers to the two toned leaves which are dark and shiny above, and dull and white below.
Oak, White <i>Quercus alba</i>	MWD - WD	90		Tree with scaly, silvery bark.
Pecan <i>Carya illinoensis</i>	SPD - WD	120	Ellipsoid nuts readily consumed by a variety of wildlife.	Large tree with sweet edible nuts.
Walnut, Black <i>Juglans nigra</i>	MWD – WD	80	Nuts consumed by squirrels.	Medium sized tree typical of central hardwood forests. Valuable timber species. Bark chocolate colored and blocky with age.

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