

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**UPLAND WILDLIFE HABITAT MANAGEMENT**

(Ac.)

**CODE 645**

**DEFINITION**

Provide and manage upland habitats and connectivity within the landscape for wildlife.

**PURPOSE**

Treating upland wildlife habitat concerns identified during the conservation planning process that enable movement, or provide shelter, cover, food in proper amounts, locations and times to sustain wild animals that inhabit uplands during a portion of their life cycle.

**CONDITIONS WHERE PRACTICE APPLIES**

Land where the decision maker has identified an objective for conserving a wild animal species, guild, suite, or ecosystem.

Land within the range of targeted wildlife species and capable of supporting the desired habitat.

**CRITERIA**

**General Criteria Applicable to all Purposes**

The Iowa NRCS [Iowa Wildlife Working Lands Habitat Evaluation](#) shall be used to identify habitat-limiting factors in the planning area.

Application of this practice shall remove or reduce limiting factor(s) in their order of significance, as indicated by results of the habitat evaluation.

Application of this practice alone, or in combination with other supporting and facilitating practices, shall result in a conservation system that will enable the planning area to meet or exceed the minimum quality criteria for wildlife habitat established in Section III of the FOTG and the [Iowa Wildlife Working Lands Habitat Evaluation](#).

Establish additional criteria for components of

this practice including, but not limited to:

- Vegetation establishment for shelter, food, and to enable movement of wildlife and beneficial insects;
- Structural measures to provide shelter, food, or enable movement of wildlife and beneficial insects; and
- Manipulation of vegetation to sustain desirable habitat conditions over time.

Sites containing hazardous waste will be cleaned prior to the installation of this practice.

Management will be conducted upon set objectives. The impacts of restoration and management activities will be monitored to ensure that stated ecological objectives are being met.

Plant species and communities will be suited to the region, soil-site conditions, and will be suitable for the planned purpose.

Native plants will be used wherever possible. See Table 1. For approved woody species as well as Standards [Conservation Cover \(327\)](#) and [Restoration and Management of Declining Habitats \(643\)](#).

In addition to official plant community descriptions, high quality, well protected, like-type plant communities found within the same Major Land Resource Area (MLRA) and on the same or similar soil series should be used as a reference in developing management plans.

Site preparation, planting dates, and planting methods shall optimize vegetation survival and growth.

Equipment travel, grazing, haying and other disturbance to habitat shall be restricted during critical periods such as nesting, brood rearing,

fawning or calving

seasons. With State Office Biologist approval, exceptions may be granted when certain disturbance causing activities are necessary to maintain the health of the plant community and control noxious weeds.

Timing and use of equipment will be appropriate for the site, soil, and weather conditions.

Undisturbed areas shall be conserved on a sufficient extent of the area to sustain disturbance-intolerant species.

Control of regulated noxious weeds and invasive plants shall be specified.

Food Plots:

- When provided, program guidance will determine food plot size. In the absence of program guidance, food plots will be a minimum of ¼ acre and a maximum of five acres.
- Plots shall be located in a manner that will not fragment interior core habitat.
- Plots should be placed on the least erosive areas of each field. Fall seedbed preparation is not allowed.
- Plots may be planted every other year on slopes of 5% or less, providing all tillage and planting operations are performed on the contour.
- Plots may be planted every year if located on 5% or less slopes providing they are in strips no wider than one chain (66 ft) and no closer than one chain to another plot.
- Plots may be located on areas steeper than 5% slope or on the same area in subsequent years as long as soil loss does not exceed "T".
- Do not control weeds in a food plot unless noxious weeds establish, then spot treat.
- Cultivation is allowed to control noxious weeds. Herbicides that would endanger adjacent seedings are not allowed. Follow label instructions.
- If food plots are discontinued or rotated, they will be reseeded to permanent vegetation. Reseeding will be completed based on criteria and as outlined in the 327 Conservation Cover standard or CRP criteria.

For additional food plot guidance, see the [Iowa NRCS Food plots for Wildlife Job Sheet](#).

## CONSIDERATIONS

This practice may affect the target species as well as non-target species through mechanisms such as hunting, predation, disease transmission, nest parasitism, etc. Consider effects of this practice on species with declining populations.

Wildlife population control may be necessary to protect and maintain certain habitats. State and federal regulations may apply to population control methods.

Consider effects management will have on disease vectors such as deer ticks.

Adding artificial nesting, basking, or hibernacula structures that are appropriate for the region can increase utilization of these areas.

Adding dead snags, tree trunks, logs, etc., can provide structure, nesting and loafing cover for wildlife and serve as a carbon source for food chain support.

Consider effects of management actions on compliance with state and federal hunting regulation (e.g., baiting).

Locating this practice adjacent to existing wetlands and other water bodies may provide connectivity to these cover types.

The improved habitat that results from the installation of this practice may lead to increased crop depredation by wildlife on adjacent cropland.

Consider adjacent uplands or water bodies that contribute to ecosystem complexity and diversity, decrease habitat fragmentation, and maximize use of the site by wildlife.

Mowing/haying may be used as an alternative to grazing and burning but will not emulate the effects of either aforementioned process. See [Forage Harvest Management \(511\)](#).

Duff from mown sites may need to be removed or burned if too dense.

For sites that have existing, desirable vegetation, burning and/or mowing the site prior to

interseeding will promote the establishment of newly seeded flora. See [Conservation Cover \(327\)](#) and [Restoration and Management of Declining Habitats \(643\)](#).

Brush control (mechanical, chemical or by hand) on weedy pasture sites and within woodlands should be accomplished prior to burning. See [Brush Management \(314\)](#), [Pasture and Hayland Planting \(512\)](#), [Forage Harvest Management \(511\)](#), and [Timber Stand Improvement \(666\)](#).

Varying the proportion, location, size, frequency, intensity, and timing (spring, summer, winter, fall) of management will add structure and variety to a site.

The use of fire should be prescribed to meet set objectives for the site. More aggressive use of fire may be warranted to accomplish desired effects, while a break in fire interval may be desired to meet a different objective. Objectives evolve over time; therefore, burn prescriptions should evolve accordingly. See [Prescribed Burn \(338\)](#) and the [Iowa NRCS Prescribed Burning Job Sheet](#). Below are considerations to keep in mind when planning to use prescribed fire as a management tool:

- Frequent burning within the same area may impose significant negative impacts on plant and invertebrate populations.
- Burning hinders succession to a shrub/scrub habitat. Burning has been shown to encourage forb seed recruitment to the seed bank and contribute to plant community richness.
- Frequent burning may create greater graminoid dominance and the depletion of forb seed in the seed bank.
- Graminoid species predominantly spread vegetatively and are little affected by periodic burning.
- With appropriate return intervals in herbaceous habitats, burning removes dense graminoid litter and allows short-lived forb establishment and reproduction; thus helping to maintain forb species, especially the annuals and biannuals, within the seed bank.
- Annual forbs typically increase in frequency the first growing season after a burn, while

perennial forb frequency increases for two growing seasons after a burn.

The following, as well as other appropriate

conservation practices, may be utilized in conjunction with this practice to create a wildlife management plan include:

- Pasture & Hay Planting (512)
- Early Successional Habitat Development/Management (647)
- Restoration and Management of Rare or Declining Habitats (643)
- Prescribed Burning (338)
- Access Control(472)
- Riparian Forest Buffer (391)
- Forest Stand Improvement (666)

## PLANS AND SPECIFICATIONS

Plans will contain the landowners objectives and species of interest, written specifications, schedules, and management techniques to be used. Maps shall be prepared for each planning area and each habitat type.

Specifications shall:

- Identify the amounts and kinds habitat elements, locations and management actions necessary to achieve the client's management objectives.
- Describe the appropriate method, timing and intensity of management needed to produce the desired habitat conditions and sustain them over time.

Specifications shall be transmitted to clients using NRCS approved specifications sheets, job sheets, or customized narrative statements included in the conservation plan.

Specific information may be provided within [NatureServe Explorer](#) species or community profiles, the [Restoration and Management of Declining Habitats \(643\)](#) and [specification](#), the [Iowa Plant Community Database](#), appropriate job sheets, or written documentation in the conservation plan.

## OPERATION AND MAINTENANCE

The following actions shall be carried out to ensure that this practice functions as intended throughout its expected life:

- Evaluate habitat conditions on a regular basis in order to adapt the conservation plan and schedule of implementation.
- Annually inspect and repair structural or vegetative components of this practice.

A plan for operation and maintenance, at a minimum, should include monitoring and management of structural and vegetative measures.

Ensure both vertical and horizontal structure within the plant community are promoted and preserved.

Vegetative manipulations to restore plant and/or animal diversity can be accomplished by prescribed burning, mechanical, biological, or chemical methods, or by a combination of the four.

Haying and livestock grazing plans - if haying or livestock grazing is implemented as a needed wildlife management tool; plans will be developed to allow the establishment, development, and management of upland vegetation for the intended wildlife purpose. See [Forage Harvest Management \(511\)](#).

Rotate periodic planned management or other treatments to mimic natural disturbance types and regimes, with no more than 1/3 of the restored/managed area treated per year.

Biological control of undesirable plant species and pests (e.g., using predator or parasitic species) shall be implemented where available and feasible.

Management measures must be provided to control invasive species and noxious weeds. Compliance with state noxious weed laws must be met. Refer to [Conservation Cover Practice \(327\)](#), [Brush Management Practice \(314\)](#), and [Pest Management \(595\)](#).

When possible, weed control will be completed on a "spot" basis to protect native forbs and legumes that benefit pollinators and other wildlife. Refer to [Conservation Cover Practice](#)

[\(327\)](#) and [Brush Management Practice \(314\)](#), and [Pest Management \(595\)](#).

## REFERENCES

Bolen, Eric and William Robinson. 2002. Wildlife Ecology and Management 5<sup>th</sup> Edition. Prentice Hall, 656 pp.

Bookhout, T.A. (ed.). 1996. Research and Management Techniques for Wildlife and Habitats, 5<sup>th</sup> Ed. Wildlife Society, 740 pp

Rayne, Neil F. and Fred C. Bryant. 1994. Techniques for Wildlife Habitat Management of Uplands. McGraw-Hill, Inc., 841 pp.

United States Department of Agriculture, Natural Resources Conservation Service. National Biology Manual. Title 190, Washington, DC.

United States Department of Agriculture, Natural Resources Conservation Service. 2004. National Biology Handbook. Washington, DC.

NatureServe Explorer Species & Communities Database: <http://www.natureserve.org/explorer/>

Butterflies and Moths of North America: <http://www.butterfliesandmoths.org/>

PARC Habitat Management Guidelines for Amphibians and Reptiles of the Midwest: <http://herpcenter.ipfw.edu/index.htm?http://herpcenter.ipfw.edu/outreach/MWHabitatGuide/index.htm&2>

Restoration and management of habitat for Reptiles and Amphibians - Iowa NRCS: <http://www.ia.nrcs.usda.gov/news/brochures/ReptilesAmphibians.html> or <ftp://ftp-fc.sc.egov.usda.gov/IA/news/Reptiles.pdf>

## NRCS Biology Technical Notes:

### Fauna

- Bats <http://directives.nrcs.usda.gov/18509.wba>
- Butterflies <http://directives.nrcs.usda.gov/18479.wba>
- Eastern Bluebird <http://directives.nrcs.usda.gov/18525.wba>
- Eastern Cottontail [ftp://ftp-fc.sc.egov.usda.gov/NHQ/ecs/Wild/cottontail\(1\).pdf](ftp://ftp-fc.sc.egov.usda.gov/NHQ/ecs/Wild/cottontail(1).pdf)

- Grassland Birds  
<http://directives.nrcs.usda.gov/18519.wba>
- Greater Prairie Chicken  
<http://directives.nrcs.usda.gov/18496.wba>
- Northern Bobwhite  
<http://directives.nrcs.usda.gov/18530.wba>
- Pollinators (Native)  
<http://directives.nrcs.usda.gov/18497.wba>
- Ring-necked Pheasant  
<http://directives.nrcs.usda.gov/18539.wba>
- Ruby-throated Hummingbird  
<http://directives.nrcs.usda.gov/18478.wba>
- Scrub-shrub Birds  
<http://directives.nrcs.usda.gov/18522.wba>
- Wild Turkey  
<http://directives.nrcs.usda.gov/18541.wba>
- Amphibians and Reptiles  
[http://policy.nrcs.usda.gov/media/pdf/tn\\_b\\_49\\_a.pdf](http://policy.nrcs.usda.gov/media/pdf/tn_b_49_a.pdf)

#### Iowa NRCS Job Sheets

- Food Plots for Wildlife <ftp://ftp-fc.sc.egov.usda.gov/IA/technical/FoodPlots.pdf>
- Pollinator Habitat  
<http://www.ia.nrcs.usda.gov/technical/JobSheet/PollinatorMar11.pdf>
- Prescribed Burn <ftp://ftp-fc.sc.egov.usda.gov/IA/technical/PrescribedBurning2009.pdf>

#### Habitat Management

- Importance of Disturbance in Habitat Management:  
<http://directives.nrcs.usda.gov/18512.wba>
- Invasive Species:  
<http://directives.nrcs.usda.gov/18516.wba>
- Managing Forests for Fish and Wildlife:  
<http://directives.nrcs.usda.gov/18482.wba>
- Warm-season (Native) Grasses and Wildlife:  
<http://directives.nrcs.usda.gov/18498.wba>
- Bird Use of Reforestation Sites:  
<http://directives.nrcs.usda.gov/18493.wba>
- Conservation Corridors Handbook: [ftp://ftp-fc.sc.egov.usda.gov/WSI/pdf/Conservation\\_Corridors\\_Manual-Contents.pdf](ftp://ftp-fc.sc.egov.usda.gov/WSI/pdf/Conservation_Corridors_Manual-Contents.pdf)

- Migratory Bird Response to Grazing:  
<http://directives.nrcs.usda.gov/18514.wba>
- Artificial Nesting Structures Leaflet # 20.  
[http://directives.sc.egov.usda.gov/media/pdf/tn\\_b\\_23\\_a.pdf](http://directives.sc.egov.usda.gov/media/pdf/tn_b_23_a.pdf).
- Wildlife Brush Piles. NRCS Conservation Practice Job Sheet 645 – Indiana  
<http://www.in.nrcs.usda.gov/technical/biology/645%20Wildlife%20Brushpile%20Jobsheet.doc>



Table 1. Standard 645 Upland Wildlife Habitat management Tree and Shrub Species Approved for Wildlife Plantings.

Common Name	Scientific Name	Moisture			Habitat				Native Region in Iowa										Seeds/oz	Mature Height (ft)	Flowering Period	Fruit Maturation	Coefficient of Conservatism*	Recommended Minimum Spacing within rows/clumps (ft)	
		Dry	Medium	Wet	Prairie	Savanna	Wetland	Woodland	All	C	EC	NC	NE	NW	SC	SE	SW	WC							
<b>Shrubs: General Stocking rate recommendations: 900-1400 shrubs/ac</b>																									
American Cranberrybush	<i>Viburnum opulus</i>	X	X			X	X													681	6	Spring, Summer	Summer, Fall	10	6
American Hazelnut	<i>Corylus americana</i>	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	21	10	Spring	Fall	3	6
American Plum	<i>Prunus americana</i>	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	54	24	Spring	Summer	2	8
Black Chokeberry	<i>Photinia melanocarpa</i>	X	X		X	X	X													140,600	6	Spring, Summer	Summer	10	10
Black Elderberry	<i>Sambucus canadensis</i>	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	17,309	7	Summer	Summer, Fall	1	6
Blackhaw	<i>Viburnum prunifolium</i>	X	X				X	X	X	X	X									411	16	Spring	Fall	6	6
Bladdernut	<i>Staphylea trifolia</i>	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	425	20	Spring	Fall	7	10
Buttonbush	<i>Cephalanthus occidentalis</i>			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	6,000	15	Summer	Fall	6	6
Chokecherry	<i>Prunus virginiana</i>	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	284	25	Spring	Fall	2	8
Common Hop Tree	<i>Ptelea trifoliata</i>	X	X			X	X	X	X	X	X									600	25	Spring, Summer	Summer	3	15
Common Witch Hazel	<i>Hamamelis virginiana</i>	X	X				X	X	X	X	X									568	20	Fall	Fall	10	6
Coralberry	<i>Symphoricarpos orbiculatus</i>	X	X		X	X				X	X	X	X	X	X	X	X	X	X	5,600	2	Spring	Fall	0	8
Downy Serviceberry	<i>Amelanchier arborea</i>	X	X			X	X			X	X	X	X	X	X	X	X	X	X	454	36	Spring	Summer	8	6
Fragrant Sumac	<i>Rhus aromatica</i>	X			X	X				X	X									900	3	Spring	Summer	6	4
Gray Dogwood	<i>Cornus racemosa</i>	X	X		X	X				X	X	X	X	X	X	X	X	X	X	709	10	Spring	Fall	1	5
Highbush Cranberry	<i>Viburnum trilobum</i>	X	X			X	X					X								12,258	12	Spring, Summer	Summer, Fall	10	7
Nannyberry	<i>Viburnum lentago</i>	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	326	28	Spring, Summer	Fall	6	6
Pawpaw	<i>Asimina triloba</i>	X	X	X			X	X			X									30	25	Spring	Summer	6	6
Prairie Ninebark	<i>Physocarpus opulifolius</i>	X	X			X	X			X	X	X		X	X					34,000	10	Summer	Summer, Fall	8	6
Redosier Dogwood	<i>Cornus sericea</i>			X		X				X	X	X	X							1,078	12	Summer, Fall	Summer	7	8
Running Serviceberry	<i>Amelanchier stolonifera</i>	X			X					X	X									5,732	15	Spring	Summer	10	6
Sandbar Willow	<i>Salix interior</i>			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	691,452	30	Spring, Summer	Spring, Summer	0	10
Shubby St. Johnswort	<i>Hypericum prolificum</i>	X	X		X	X	X							X	X	X	X	X	X	140,000	3	Summer, Fall	Summer	7	2
Silky Dogwood	<i>Cornus amomum</i>			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	738	10	Spring, Summer	Summer, Fall	6	10
Winterberry	<i>Ilex verticillata</i>	X	X		X	X	X			X	X	X								5,930	10	Spring, Summer	Fall	6	6
<b>Subshrubs</b>																									
Early Wild Rose	<i>Rosa blanda</i>	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	2,600	4	Summer	Summer	4	6
False Indigo	<i>Amorpha fruticosa</i>			X		X				X	X	X	X	X	X	X	X	X	X	3,700	15	Summer	Fall	5	15**
Illinois Rose	<i>Rosa setigera</i>	X	X			X	X													10,000	16	Summer	Summer	4	8
Lead Plant	<i>Amorpha canescens</i>	X	X		X	X				X	X	X	X	X	X	X	X	X	X	16,000	4	Summer	Fall	8	4
New Jersey Tea	<i>Ceanothus americanus</i>	X	X		X	X				X	X	X	X	X	X	X	X	X	X	7,600	3	Summer	Fall	8	4
Pasture Rose	<i>Rosa carolina</i>	X	X		X	X				X	X	X	X	X	X	X	X	X	X	2,500	5	Summer	Summer	4	6
Prairie Wild Rose	<i>Rosa arkansana</i>	X	X		X	X				X	X	X	X	X	X	X	X	X	X	2,500	3	Summer	Summer	4	3
Red Root	<i>Ceanothus herbaceus</i>	X			X	X				X	X	X	X							10,000	3	Summer	Summer	8	4
Soapweed	<i>Yucca glauca</i>	X			X	X						X								1,800	1	Spring, Summer	Fall	10	4
Swamp Rose	<i>Rosa palustris</i>			X	X	X	X													1,600	8	Summer	Summer	7	4
<b>Trees: General stocking rate recommendations: 700 trees/ac for forest, 400 trees/acre for woodland, and 30-100 trees/ac for Savanna</b>																									
American Linden, Basswood	<i>Tilia americana</i>	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	4,540	80	Summer	Fall	5	30
Big-tooth Aspen	<i>Populus grandidentata</i>	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	283,750	65	Spring	Summer	4	25
Bitternut Hickory	<i>Carya cordiformis</i>	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	5	75	Spring	Fall	5	20
Black Cherry	<i>Prunus serotina</i>	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	312	80	Spring, Summer	Summer	3	20
Black Oak	<i>Quercus velutina</i>	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	20	80	Spring	Fall	4	20
Black Walnut	<i>Juglans nigra</i>	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	2	100	Spring	Fall	4	20
Bur Oak	<i>Quercus macrocarpa</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	4	100	Spring	Fall	4	20
Butternut	<i>Juglans cinerea</i>	X	X			X	X	X	X	X	X				X	X				2	80	Spring, Summer	Fall	6	20
Chinkapin Oak	<i>Quercus muehlenbergii</i>	X	X			X	X			X	X			X	X					25	70	Spring	Fall	7	20
Cottonwood	<i>Populus deltoides</i>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	26,563	190	Spring	Summer	1	20
Hackberry	<i>Celtis occidentalis</i>		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	240	60	Spring	Fall	2	10
Kentucky Coffeetree	<i>Gymnocladus dioica</i>		X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	216	75	Spring, Summer	Fall	5	20

Common Name	Scientific Name	Moisture			Habitat			Native Region in Iowa												Seeds/oz	Mature Height (ft)	Flowering Period	Fruit Maturation	Coefficient of Conservatism*	Recommended Minimum Spacing within rows/clumps (ft)
		Dry	Medium	Wet	Prairie	Savanna	Wetland	Woodland	All	C	EC	NC	NE	NW	SC	SE	SW	WC							
Mockemut Hickory	<i>Carya alba</i>	X	X				X								X	X	X		5	85	Spring	Fall	7	20	
Northern Pecan	<i>Carya illinoensis</i>		X				X					X			X				8	120	Spring	Fall	7	40	
Northern Pin Oak	<i>Quercus ellipsoidalis</i>	X					X			X		X			X				18	70	Spring	Fall	4	20	
Pagoda Dogwood	<i>Comus alternifolia</i>		X				X		X	X	X	X		X	X				550	25	Spring, Summer	Summer	8	15	
Quaking Aspen	<i>Populus tremuloides</i>		X				X	X	X	X	X	X	X	X	X	X	X	X	237,215	65	Spring	Summer	2	30	
Red Oak	<i>Quercus rubra</i>	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	8	81	Spring	Fall	6	20	
Shagbark Hickory	<i>Carya ovata</i>		X				X	X	X	X	X	X	X	X	X	X	X	X	6	75	Spring	Fall	5	20	
Sugar Maple	<i>Acer saccharum</i>		X				X			X		X			X				300	100	Spring	Fall	5	20	
White Oak	<i>Quercus alba</i>	X	X			X	X	X	X	X	X	X		X	X	X	X	X	5	100	Spring	Fall	6	20	

\* Numerical values between 0-10 are assigned to a particular species based on the observed behavior of populations within Iowa. For example, a CC of 0 is given to plants such as *Acer negundo* (box elder) that have demonstrated little fidelity to any remnant natural community (i.e. may be found almost anywhere). Similarly, a CC of 10 is applied to plants like *Photinia melanocarpa* (Black Chokeberry) that are almost always restricted to remnant habitats (i.e. a high quality natural area). Plants that reliably occur in native communities but occur on both degraded and un-degraded sites are given an intermediate value, such as *Quercus alba*

\*\* use a spacing of 3-6' for Quail Covey Headquarters