

# Wolf Hollow Forest Wildlife Stewardship Plan

April 18th

# 2022

Actively managing the forestlands owned by the Iowa Department of Natural Resources Wildlife Bureau are critical to improving habitat for a variety of wildlife species and improving the forest ecosystem structure and function. Stand maps and prescriptions are provided to direct the forest management across 40 acres at the Wolf Hollow Wildlife Management Area. Plan developed by Jeremy Cochran, District Forester, and Heath Van Waus, Wildlife Biologist.

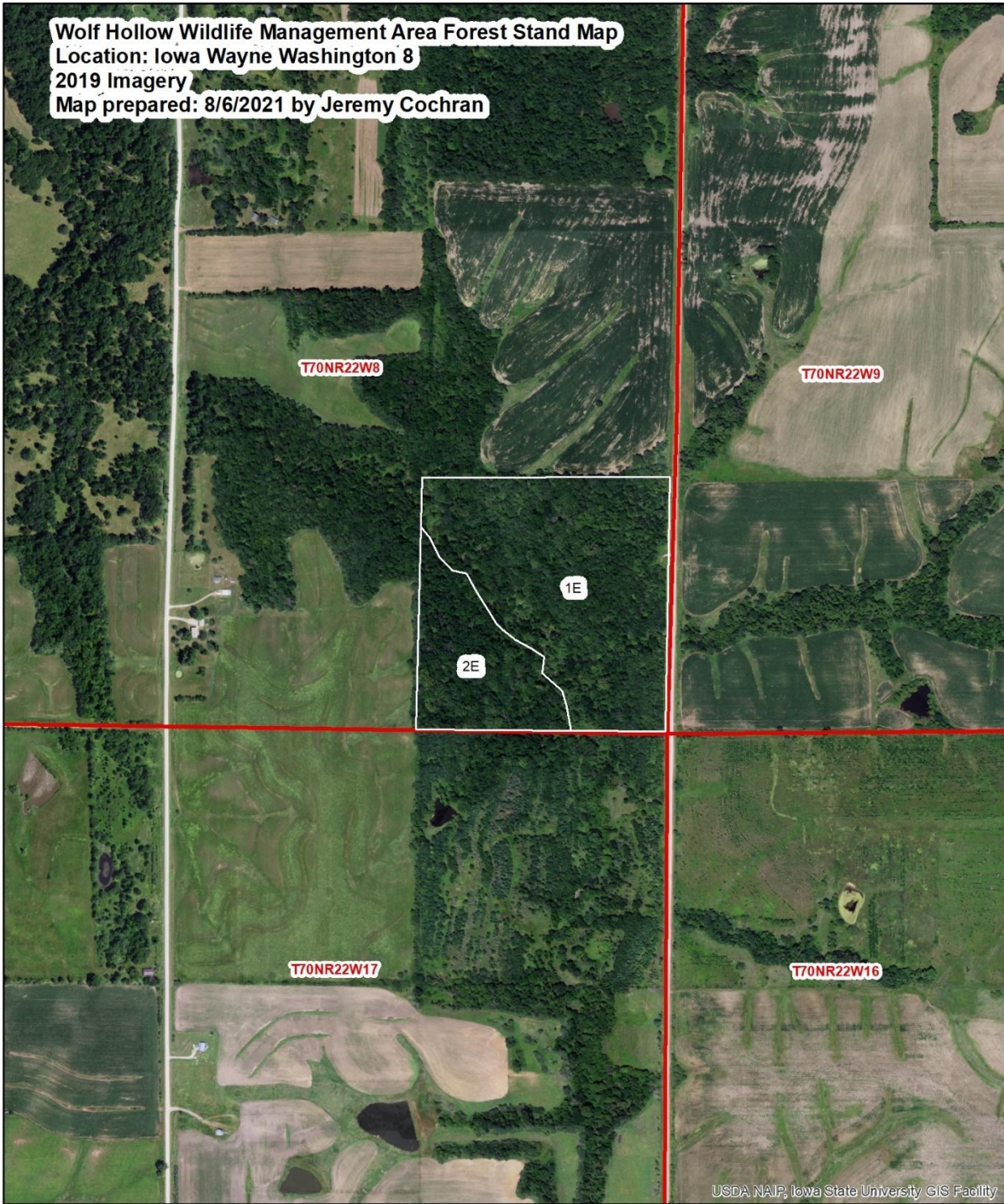


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## **Forest Stand Map of Wolf Hollow Wildlife Management Area**

**Wolf Hollow Wildlife Management Area Forest Stand Map**  
Location: Iowa Wayne Washington 8  
2019 Imagery  
Map prepared: 8/6/2021 by Jeremy Cochran



USDA NAIP, Iowa State University GIS Facility

**Legend**

- Wolf Hollow WMA
- sections



## **How the Forest Wildlife Stewardship Plan Was Developed**

The wildlife biologist is the manager of the Wolf Hollow Wildlife Management Area (WMA) and determines the objectives to address the habitat needs for Species of Greatest Conservation Need (SGCN) as determined by the Iowa Wildlife Action Plan, Iowa Forestland Action Plan, and the forestland condition of each area. Wolf Hollow WMA includes 40 acres of 100% forestland. Managing forests is essential to improve the areas for wildlife, forest health, and recreation.

This plan is the result of forest cruising and stand mapping by the district forester. Stands are identified by tree species, tree size, relative stand density, topography, and management system. The biologist and forester discuss the options for each stand and how management of that stand will fit into the overall management for the area. The forester's prescriptions are designed to manage the stand to reach the established goals and objectives for the property.

The wildlife biologist and technicians are responsible for the day to day operations of the WMA. The forester will implement the forest wildlife stewardship plan in coordination with the wildlife biologist.

One of four management systems is specified for each stand. This identifies the overall management system for that stand and designates the "road map" for what work will take place on the site in the future.

Proposed management recommendations for each stand are based on whether the area will be managed to create an even age system, uneven age system, viewshed, or early successional habitat. The decision on what system will be used was based on the objectives for the area to maintain an oak component where feasible, develop a diverse forested landscape, protect fragile sites, and improve water quality through soil conservation.

**Early Successional** - Areas are clearcut every 15 years to maintain young, high stem density habitat. These areas are generally on the woodland edges to feather the edge or continuation of normal timber stand improvement activities to the field edges.

**Even Age** - Shade intolerant species such as oak and walnut require full sunlight to grow. Even age management involves a clearcut at some point to create the full sunlight condition. Even age stands are clearcut every 105-125 years. Clearcutting also creates early successional habitat for the first 15 years.

**Uneven Age** - Uneven age management can be used to manage species that will grow in shade such as hard maple and basswood. Every 20 years, the stand can be selectively harvested to remove the mature and defective trees. The openings are filled with young hackberry, maple and basswood, creating an all age or uneven age forest.

**Viewshed** - These are steep slopes, high recreational use areas, and/or buffers along the streams and rivers where management will be minimal. Management activities are not entirely excluded from these areas but are rare in occurrence.

### **Introduction to Wolf Hollow WMA**

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The Department of Natural Resources (DNR) Wildlife Bureau is divided into 16 management units statewide. Within these wildlife management units, a wildlife management biologist and his/her staff are responsible for the maintenance and operation of these WMAs. The species composition of both flora and fauna can vary greatly within these WMA's. Most WMA's encompass an array of habitat types: woodland, native prairie/reconstructions, wetlands, ponds, non-native grasses and forbs, some row crops. State-owned lands, which are administered by the Iowa DNR receive direct management efforts for wildlife, wood production, woodland health, recreation, soil conservation, and plant and animal species of special concern.

The Wildlife Bureau has recognized and acted on the need for forest wildlife stewardship plans (FWSP's) to properly manage the forest resources on state owned lands. Although forests change over a long period of time, we understand that a hands-off approach will ensure that these forests 100 years from now will be much different than the forests of today. Not all forest stands are the same, some may take more than 120 years to mature, while others, depending on species composition, can mature at a much quicker rate. This slower change requires managers to plan over a long-term period of time and leave a written record of these plans in the form of FWSP's.

Wolf Hollow (WMA) is located in Section 28 of Washington Township of Wayne County, Iowa. According to 2012 land and canopy cover data, the Wolf Hollow WMA is comprised of 40 total acres with 40 of those acres being forested (100%). Wolf Hollow cover type acreages consist of Woodland (40), Shrubland (0), Agricultural (0), Wetland/Pond (0) and Grassland (0).

The entire Wolf Hollow WMA was donated in 1987 by C.V. Fisk.

Wolf Hollow WMA Forest Wildlife Stewardship Plan (FWSP) is the result of forest inventory data collection, forest stand mapping, and data analysis. This is a cooperative work between the Iowa DNR Forester and Wildlife Biologist within the Iowa DNR Wildlife Bureau.

## **Goals**

*The Wolf Hollow WMA FWSP is an ecologically based forest management plan. Management goals are focused toward improving forest health and maintaining the forest ecosystem structure and function, with all other forest uses being considered, but not being the primary management goal. With Wolf Hollow WMA being classified as a wildlife management area, work conducted on this site will be geared towards plant and animal species that utilize this area. "Species of greatest conservation need" will be important for consideration as well as common species, other game and/or nongame wildlife.*

Funding for the management of Wolf Hollow WMA has been almost exclusively hunter generated monies, i.e. license fees and excise taxes on sporting equipment. A primary objective for management of the area is to improve habitat for game species such as white-tailed deer, wild turkey, and squirrels. On the other hand, the IA DNR recognizes the effects of its management actions on nongame species as well, particularly those that are threatened, endangered, or species of greatest conservation need. The Iowa DNR's Iowa Wildlife Action Plan (IWAP) identifies certain wildlife species as species of "greatest conservation need" (pages 35-61)

<https://www.iowadnr.gov/Conservation/lowas-Wildlife/Iowa-Wildlife-Action-Plan>

Other stewardship considerations that are incorporated into forest management decisions are the protection of identified threatened and endangered plant and wildlife species, best management practices (BMP's) to protect soil and water quality, forest health considerations, and the protection of any identified "special sites".

The Wolf Hollow FWSP is a guideline for recommended wildlife management work. Detailed prescriptions will be developed prior to scheduled or recommended management practices in order to take into account the unique stand conditions and more specific targeted wildlife habitat needs. These specific prescriptions will be in the form of detailed practice project plans, developed with collaboration between the DNR District Forester and DNR Wildlife Biologist. A record of the completed management activities will be kept on file at both the area manager's and district forester's office so that evaluations can be made and compared to determine if management objectives are being met according to the FWSP.

### Current Distribution of Tree Size on Wolf Hollow WMA

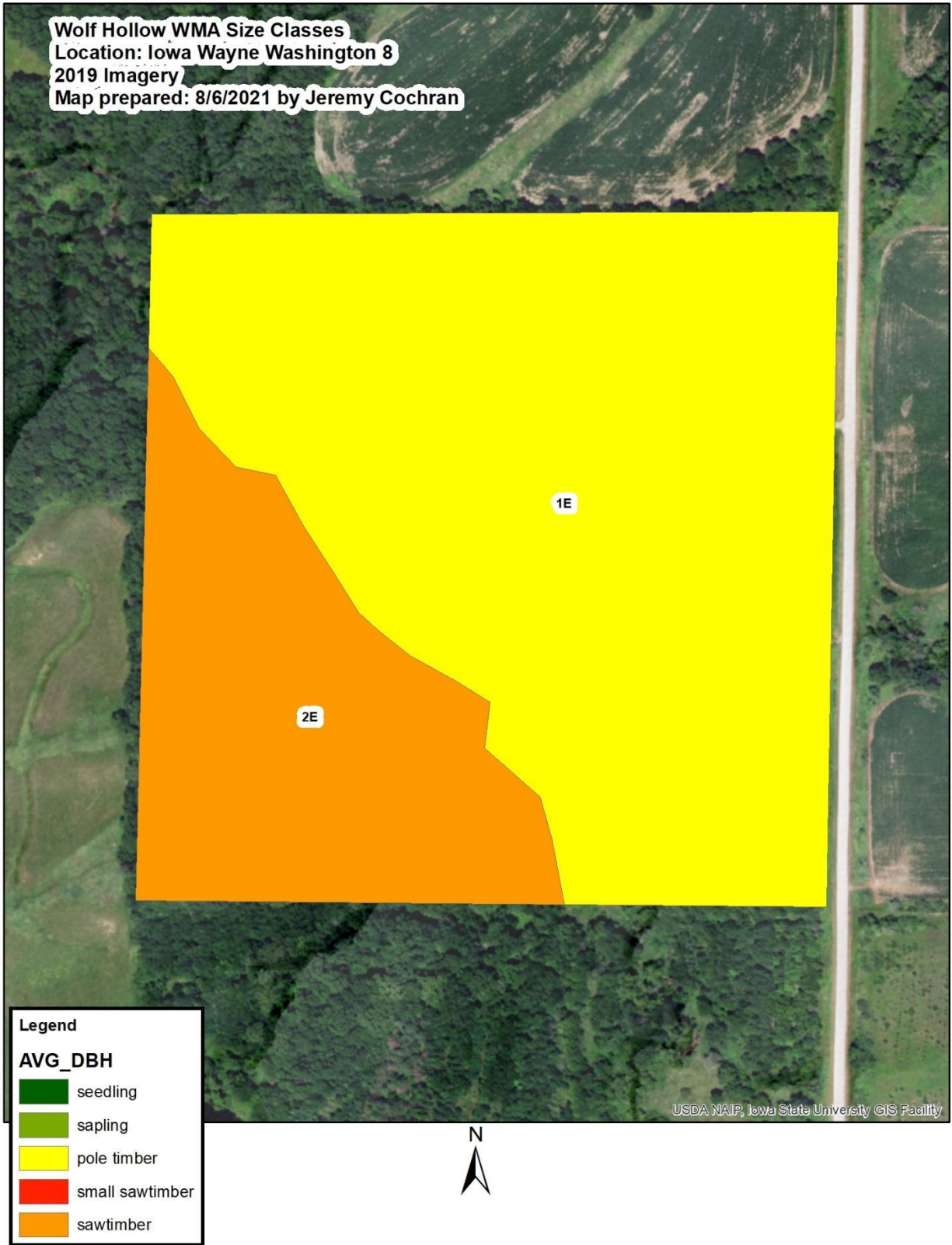
The forest stands were cruised and mapped according to average tree size classes. Refer to the map on the following page.

<b><i>Tree Size Class</i></b>	<b><i>Acres</i></b>	<b><i>% of Total Area</i></b>
Seedlings (<1" DBH)	0	0
Saplings (2" DBH)	0	0%
Pole size (4-12" DBH)	29	73%
Small sawlog size(14-16"DBH)	0	0%
Sawlog size (≥18" DBH)	11	23%
Total	40	



## **Map of Average Tree Sizes for Wolf Hollow WMA**

Wolf Hollow WMA Size Classes  
Location: Iowa Wayne Washington 8  
2019 Imagery  
Map prepared: 8/6/2021 by Jeremy Cochran



## Proposed Management Systems for Wolf Hollow WMA

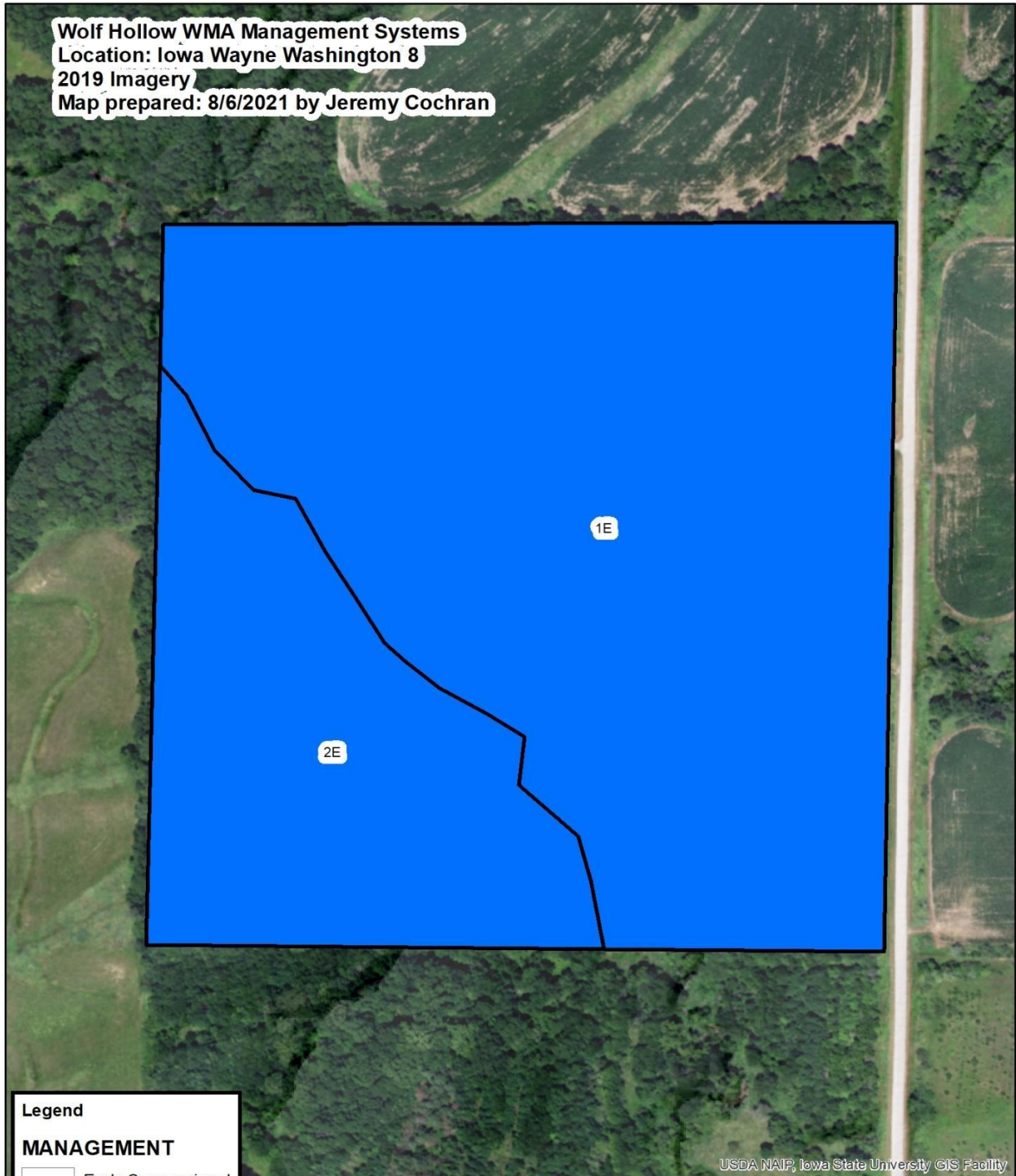
Recommendations for each stand were based on whether the area will be managed to create early successional growth, on an even age system, uneven age system, or as viewshed. The decision on what system would be used was based on the objectives for the area to maintain an oak component, develop a diverse woodland landscape, protect fragile sites, improve water quality and increase the acres of early successional growth.

Based on recommendations for the areas, the acres under each management system are as follows. Refer to the map on the following page.

<b><i>Management System</i></b>	<b><i>Acres</i></b>	<b><i>% of Total Area</i></b>
Early Successional	0	0%
Even Age	40	100%
Uneven Age	0	0%
Viewshed	0	0%
Total	40	100

## **Map of Management Systems for Wolf Hollow WMA**

Wolf Hollow WMA Management Systems  
Location: Iowa Wayne Washington 8  
2019 Imagery  
Map prepared: 8/6/2021 by Jeremy Cochran



## Even Age Management

Even Age Management involves growing a stand of trees which are close to the same age. At some point in a stand's life, the area is clearcut which results in the even age structure. This type of management creates excellent habitat for deer, turkey, squirrels and other game and nongame wildlife species. It is essential for regeneration of oak, which requires full sunlight. The only way that oak can be maintained as a component of the forest over the long run is by practicing some form of even age management.

Each stage or age class of an even age stand provides habitat for a suite of wildlife species. For example, regenerating stands (1-10 years old) benefit the same species as do early succession stands, i.e. blue-winged warblers, black-billed cuckoo, yellow-billed cuckoo, eastern towhee, as well as bobwhite quail and American woodcock.

Sapling to small pole size stands between 10-20 years old may be used by black-and-white, Kentucky, and worm-eating warblers. Pole size to medium sized trees (20-60 years) tend to be used by canopy nesters such as scarlet tanagers and ground nesters such as ovenbirds and black-and-white warblers.

Mature stands of 60-125+ years of age are used by birds such as the wood thrush, Acadian flycatcher, ovenbird, worm-eating warbler, and scarlet tanager.

As woodland stands age, they constantly lose trees to competition, insects, disease, etc. The dead and dying trees provide habitat for cavity nesters such as woodpeckers, nuthatches, titmice, and creepers. The state- and federally-Endangered Indiana bat and federally-Threatened northern long-eared bat use loose barked live trees such as shagbark hickory as well as the sloughing bark from dying trees for their maternity colonies.

Thus, even age management has the potential to provide a large variety of age classes that can meet the needs of a variety of wildlife species.

While there are many methods to open a stand to sunlight, clearcutting and shelterwood harvesting are the most common. Clearcutting is a practice that opens the stand all at once. Clearcutting also provides highly desired early successional habitat for the first 15-20 years until the tree canopy closes. Regeneration via clearcutting requires there be sufficient oak seedlings or advanced regeneration present. Minus these seedlings, bare root planting may be necessary following clearcutting.

Shelterwood harvests are one way of recruiting seedling production prior to a clearcut. Shelterwood harvests include several thinnings done prior to the final clearcut. If the shelterwood is done correctly, the trees left after the thinnings will provide seed and the forest will be open enough to allow sunlight to reach the forest floor. The trees left will also help provide shade that limits the growth of undesirable or invasive plant species.

This method can take 15-20 years to create the next oak stand and may need mechanical or fire disturbance to keep out undesirable species. After sufficient seedling or advanced regeneration is present, the stand needs to be clearcut to successfully regenerate the oak stand.

Crop tree release is discussed in this plan as a type of timber stand improvement. This practice is done most frequently when the trees are pole sized. The goal of the practice is to choose up to 50 trees per acre that are considered to have the best genetics. These trees are typically tallied and marked with paint, and then the trees that touch the canopy of the crop tree are killed to allow the crop tree to reach maximum growth potential, increase mast production, and improve forest health.

Thinning the understory or weed tree removal is a practice also used in even age management. This practice involves removing trees that are below the main canopy to allow more sunlight to get to the forest floor. Ironwood, bitternut hickory, buckeye, elm, hackberry, and other shade tolerant species warrant this practice when species like oak are wanted in the future.

Prescribed fire is an effective and relatively inexpensive tool that has a long history of use and continues to be studied in managing oak stands. Occasional burning of the leaf layer in the woods will kill thin barked species that are less than two-inches diameter such as hackberry, hard maple, buckeye, cherry, elm, bitternut hickory and ironwood. Fire will expose mineral soil and open up the ground to sunlight. These conditions favor the natural regeneration of oak. Depending on the extent of root system development, some oak seedlings will tolerate fire better than others, but as a whole, oaks tolerate fire better than other tree species. The top of an oak seedling often will die back following fire, but the roots will send up new growth soon thereafter. Oak has a superior competitive advantage thanks to their strong root collar and ability to sprout. Most shade tolerant trees, such as elm, bitternut, ironwood, and hackberry do not possess strong resprouting capabilities.

### **Uneven Age Management**

Uneven age management develops a stand of trees with all DBH size classes. The stand structure is developed by selectively harvesting mature and defective trees, and removing unwanted small trees that are damaged or defective. Because uneven age stands always have large trees present, this system favors species that will grow in shade such as hackberry, hickory, hard maple and basswood. Sustainable harvest guidelines dictate the ability to selectively harvest mature and defective trees every 20 to 25 years in these stands.

Uneven age management will maintain blocks of woodland that will always have larger trees. This system is desirable where the overstory is lacking oaks, on steep slopes, and in areas where always having large trees is important.

Uneven age management areas will provide continuous tracts of woodland with infrequent disturbance. Large tracts of uneven age management will provide necessary habitat for Neotropical migratory bird species such as cerulean, hooded, Canada, and Kentucky warblers and is also important post-fledging habitat for songbirds that breed in early successional forest. Selective harvesting will create small openings in the canopy, which will increase ground cover, and enhance stand structure. Den trees will be left to provide cavities for wildlife such as woodpeckers, bats, and squirrels. Large oaks that are healthy will be left to provide acorns and host caterpillars, important food sources for many wildlife species. Timber stand improvement and selective harvesting will create woody debris on the forest floor for reptiles and amphibians and small mammals.

### **Early Successional Management**

Many bird species such as bobwhite quail, American woodcock, blue-winged warbler, black-billed cuckoo, yellow-billed cuckoo, and eastern towhee are dependent on the early successional stages of woody growth. The high stem density of both trees and shrubs provides suitable nesting habitat and protection from predators. Feathering and softening the edges may lessen nest parasitism of interior forest bird species by brown-headed cowbirds. The early succession management areas will be managed on a 15-year rotation. In other words, every 15 years the stands will be cut to create areas with high stem density. Shelterwood and clearcut harvesting will also increase the early successional acreage over time.

### **Viewshed Management**

Viewshed areas are typically areas with poor access, steep fragile slopes and areas along streams that are best left to naturally progress through succession. Viewsheds may also be used to protect areas for endangered species or be used to protect certain public use facilities. Management can take place in these areas where desirable, but the major objective is to have minimal disturbance..

### **Income from Timber Harvests**

Income generated from timber harvesting operations must be reinvested into the area to promote oak regeneration and manage the forest for wildlife by thinning young stands, removing weed trees in the understory, and controlling invasive species. Without this reinvestment, there is little chance that the WMA annual budget will allow the recommendations in this plan to be implemented. Harvesting is not a significant portion



of this plan. The majority of work recommended is directed at thinning young stands so the oak is not shaded by other trees and at removing undesirable species to encourage regeneration of desirable oaks.

### **Work Plan for Wolf Hollow WMA**

The work plan for Wolf Hollow WMA is designed to aid foresters and natural resource managers in the implementation of forest management practices. It is written with the presumption that these professionals have a basic understanding of forest management principles and techniques. Every detail has not been outlined in the plan because the plan would become too long to be of practical use. This plan is intended to get work accomplished on the ground.

The letter following each stand number indicates the recommended Management System (i.e. **E**-even age, **U**-uneven age, **ES**-early succession)

#### **Stand 1E: 29 ac**

The overstory includes pole size black walnut, bur oak, shagbark hickory, hackberry, black oak, and elm. Average relative stocking is 86%. The area was mostly cleared for agricultural uses thus the resulting trees are approximately 50 years old. A few large bur oak trees are widely scattered in the lower parts of the drainages. These are the remaining wolf trees from when the area was kept open by grazing livestock through the 1970's. The current stand is heavily shaded due to the closed canopy conditions. There was a farm building located near the current parking lot prior to 1970. Honeysuckle, autumn olive, and multiflora rose are present and the worst along the parking lot and road edges. Non-native purple dead nettles were found but are not known to be terribly invasive. This plant most likely escaped from a nearby garden.

Prescription: This is a high priority stand. Timber Stand Improvement in the form of Crop Tree Release (CTR) is recommended. Crop trees will be desirable species with good form and lack of significant defects. Trees with crowns touching or over topping the crown of the crop trees will be killed by felling or double girdling. Species normally selected as crop trees are walnuts, oaks, and occasional shagbark hickory. Species diversity is encouraged in selecting crop trees.

Additionally, lightly release the old wolf trees but do not sacrifice a thrifty, good quality crop tree to do so. Remove all understory trees >1" diameter that are found within the dripline of these trees. This will prolong the life of each tree and improve conditions for oak regeneration and native woodland herbaceous plants.

Periodic prescribed fire is recommended throughout this stand to restore oak ecology and minimize multiflora rose, honeysuckle, autumn olive, and purple dead nettle. Pole size trees are about the earliest age class to start reintroducing fire back into the oak system. Fires should be low intensity and implemented during the dormant season.

Additional invasive species control may be needed, including but not limited to, hack-and-squirt, cut stump, basal bark, and foliar herbicide application.

### **Stand 2E: 11 ac**

The fully-stocked overstory includes sawtimber size bur oak and shagbark hickory. The area was not cleared like stand 1E thus the trees are approximately 175 years old and grew after widespread forests were cleared during the settlement times of Iowa, late-1800's. Average trees are 20-22 inches DBH. Basal area ranges from 70-140 square feet per acre with an average 100. Some of the oaks are already declining and dying. Pole size shagbark hickory are established in a few of these locations. The understory is very dense with 1-4" DBH hackberry ( $\approx 95\%$ ), hickory, and elm. The next forest will be hackberry if no management is implemented. Seedling regeneration is nearly absent. Shrubs are nearly absent due to the heavily shaded conditions. An old cattle pond was present but the structure failed allowing the existing gully to expand.

Prescription: This is a high priority stand to remove understory and weed trees. The goal should be to move this towards a shelterwood system over the next 10-20 years. Increasing partial sunlight to the forest floor will be important during this timeframe. Timber Stand Improvement in the form of Weed Tree Removal (WCTR) is recommended. All understory  $\geq 2$ " DBH should be removed to promote conditions for oak regeneration.

Periodic prescribed fire is recommended to minimize shade tolerant trees  $< 2$ " DBH and invasive species. Using fire approximately one to three years after the WTR may be ideal. This will greatly reduce the amount of hackberry reproduction and improve native herbaceous plants. Repeat fire prescription again if needed but evaluate oak reproduction first.

Additional invasive species control may be needed, including but not limited to, hack-and-squirt, cut stump, basal bark, and foliar herbicide application.

Eventually, a shelterwood harvest (30-40% of the mature canopy) to promote more oak regeneration will be done. The understory removal should be done at least 5 years prior

to shelterwood harvest. Periodic prescribed fire may be needed 3-5 years after shelterwood harvest if weed tree species and/or invasive species are out competing oak regeneration. Once oak regeneration is adequate, fire should be stopped until oak trees are pole size.

### **Sustainable Forestry Guidelines for Wolf Hollow WMA**

Sustainable timber harvesting guidelines should be implemented on 3 acres every 10 years at Wolf Hollow WMA. These are *average* guidelines and will vary depending on several factors including stand location, access, and nearby management needs. This assumes 40 acres of even age management and 125-year rotation age for upland hardwoods (oak-hickory). Shelterwood harvest requires one entry for commercial thinning and weed tree removal to promote oak regeneration near 105 years. And finally clearcut near 125 years to release the oak seedlings and/or advanced regeneration. Up to 20 years may be allowed or needed to establish desirable oak regeneration before the final clearcut.

### **High Priority Projects**

Timber Stand Improvement:

1E, 29 ac, crop tree release

2E, 11 ac, weed tree removal

Shelterwood harvest (following sustainable guidelines):

Stand 2E 3 ac every 10 years

### **Summary of Stands**

STAND #	ACRES	OVERSTORY	SIZE CLASS	MANAGEMENT	PRESCRIPTION	PRIORITY
1E	29	Oak-Hickory	pole timber	Even Age	crop tree release	H
2E	11	Oak-Hickory	sawtimber	Even Age	WTR-shelterwood	H

## APPENDIX

**Table 1. Forest Breeding Birds of Greatest Conservation Need in SC Iowa**

Common Name	Scientific Name
Bald eagle	<i>Haliaeetus leucocephalus</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Broad-winged hawk	<i>Buteo platypterus</i>
Ruffed grouse	<i>Bonasa umbellus</i>
American woodcock	<i>Scolopax minor</i>
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Long-eared owl	<i>Asio otus</i>
Whip-poor-will	<i>Caprimulgus vociferus</i>
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Acadian flycatcher	<i>Empidonax virescens</i>
Eastern Screech Owl	<i>Otus asio</i>

Chuck-wills-widow	<i>Caprimulgus carolinensis</i>
Northern Flicker	<i>Colaptes auratus</i>
Eastern Wood-peewee	<i>Contopus virens</i>
Veery	<i>Catharus fuscescens</i>
Wood thrush	<i>Hylocichla mustelina</i>
Blue-winged warbler	<i>Vermivora pinus</i>
Cerulean warbler	<i>Dendroica cerulea</i>
Baltimore Oriole	<i>Icterus galbula</i>
Prothonotary warbler	<i>Protonotaria citrea</i>

Worm-eating warbler	<i>Helmitheros vermivorus</i>
Louisiana waterthrush	<i>Seiurus motacilla</i>
Kentucky warbler	<i>Oporornis formosus</i>

**Table 2. Forest Migratory Birds of Greatest Conservation Need in SC Iowa**

<b>Common Name</b>	<b>Scientific Name</b>
Golden-winged warbler	<i>Vermivora chrysoptera</i>
Canada warbler	<i>Wilsonia canadensis</i>
Olive-sided flycatcher	<i>Contopus cooperi</i>
Bay-breasted warbler	<i>Dendroica castanea</i>

**Table 3. Forest Mammals of Greatest Conservation Need in SC Iowa**

<b>Common Name</b>	<b>Scientific Name</b>
Northern Long-eared bat	<i>Myotis septentrionalis</i>
Evening bat	<i>Nycticeius humeralis</i>
Indiana bat	<i>Myotis sodalis</i>
Woodland vole	<i>Microtus pinetorum</i>
Spotted skunk	<i>Spilogale putorius</i>

Southern Flying Squirrel	<i>Glaucomys volans</i>
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**Table 4. Forest Reptiles and Amphibians of Greatest Conservation Need in SC Iowa**

Common Name	Scientific Name
Smallmouth salamander	<i>Ambystoma texanum</i>
Cope's Gray treefrog	<i>Hyla chrysocelis</i>
Blanchard's Cricket Frog	<i>Acris blanchardi</i>
Eastern Gray Tree Frog	<i>Hyla versicolor</i>

Ornate box turtle	<i>Terrapene ornata</i>
Slender glass Lizard	<i>Ophisaurus attenuatus</i>
Northern Prairie Skink	<i>Plestiodon septentrionalis</i>
Smooth earth snake	<i>Virginia valeriae</i>
Western worm snake	<i>Carphophis vermis</i>
Smooth green snake	<i>Liochlorophis vernalis</i>

Prairie kingsnake	<i>Lampropeltis calligaster</i>
Speckled kingsnake	<i>Lampropeltis getulus</i>
Bullsnake	<i>Pituophis catenifer sayi</i>
Timber Rattlesnake	<i>Crotalus horridus</i>

**Table 5. Forest Butterflies of Greatest Conservation Need in SC Iowa**

<b>Common Name</b>	<b>Scientific Name</b>
Pipevine swallowtail	<i>Battus philenor</i>
Sleepy Duskywing	<i>Erynnis brizo</i>
Zebra swallowtail	<i>Eurytides marcellus</i>
Silvery Blue	<i>Glaucopsyche lygdamus</i>
Hickory Hairstreak	<i>Satyrium caryaevorum</i>
Edward's Hairstreak	<i>Satyrium edwardsii</i>



Striped Hairstreak	<i>Satyrium liparops</i>
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**Endangered Species Considerations Section**

While habitat management activities are intended to have an overall conservation benefit through habitat improvement, at times these activities may have unintended consequences for a variety of species. For this reason, prior to implementation, forest management activities described here will be reviewed internally to assess potential impacts to both state and federal species of concern. Site records from the DNR’s Natural Areas Inventory Program (NAI) and access to the online database are provided to management biologists for use in project activity planning. When protected species are known to occur in the management area or if suitable habitat for these species is present, management biologists implement conservation measures as described in the Operation & Maintenance Plan for Wildlife Management Areas in the State along with recommendations from NAI staff.. Management activities are not initiated until this review has been completed and T/E comments/concerns have been addressed.

Although surveys for threatened and endangered plants and animals have not been completed for the Wolf Hollow WMA to date, numerous state- and federally-protected species are known to occur or may occur in Wayne County and may be present in the WMA in areas of suitable habitat if present.

**Guidelines for Protecting Indiana Bat Summer Habitat**

Indiana bats have been documented in many southern Iowa counties, including Wayne County. These guidelines were prepared to provide information about the Indiana bat and its summer habitat requirements in Iowa and to prevent inadvertent harm to the species through various human activities. This update of the guidelines is in response to changes in the US Fish and Wildlife Service requirements for protecting this endangered species. The changes include:

- No cut dates changed to April 1 through September 30
- Updated US Fish and Wildlife Service guidelines for mist net surveys

The Indiana bat is a federal (50CFR Part 17) and state (Code of Iowa, Chapter 481B) endangered species that occurs in southern Iowa from April through September.

Female Indiana bats (*Myotis sodalis*) have their young beneath loose or peeling tree bark. Most nursery colonies have been found on the trunk or large branches beneath

the bark of standing dead trees. The nursery colonies are located along streams and rivers or in upland forest areas.

Trees that retain sheets or plates of bark that provide space beneath the bark when dead, such as red oak, post oak, and cottonwood, are potential roost trees. Live trees such as shagbark and shellbark hickory are also occasionally used as roosts.

Indiana bats have also been captured on the edge of urban areas. It is likely that the bats would use areas on the edge of urban areas only if there is suitable habitat such as a greenbelt or a large park with a natural forest component. This would exclude city parks that are maintained as mowed areas.

In Iowa, records for the Indiana bat have occurred in areas of 10% or greater forest cover and near permanent water. Trees with slabs or plates of loose bark are considered suitable as summer roosts.

Suitable summer habitat in Iowa is considered to have the following within a one-half or one-mile radius of a location:

- Forest cover of 10% or greater within one-half mile.
- Permanent water within one-half mile.
- The potential roost trees ranked as moderate or high for peeling or loose bark within one mile.

Do not cut down potential roost trees between April 1 and September 30. Such trees can be left standing, live or dead, during that time period.

### **Special Note on Northern Long-eared Bat**

The Northern Long-eared Bat (NLEB) is a federally Threatened Species that can occur in any county of Iowa. Management activities should follow guidance for the Northern Long Eared Bat (NLEB). In areas of suitable habitat, current guidelines allow for tree removal activities between Sept. 30<sup>th</sup> and April 1<sup>st</sup>, and woodland burns outside of the maternity and nesting season (Sept. 30<sup>th</sup> – April 1<sup>st</sup>). Please contact the U.S. Fish and Wildlife Service for updated information pertaining to the NLEB.