

Forest Stewardship Plan (FSP)
McCoy Wildlife Management Area
Boone County



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INTRODUCTION

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This plan summarizes the current conditions of the forested habitat in the McCoy Wildlife Management Area and identifies silvicultural management strategies intended to improve the future health and condition. In addition to hunting, wildlife viewing, wildlife habitat, soil and watershed protection and natural biodiversity this large tract of contiguous forest provides economic benefits to the area in the way of outdoor recreation and tourism, fall color viewing, mushroom hunting, shed hunting, forest and timber products. The goal of this effort is to manage the forest to benefit the wildlife species, plant communities, terrestrial ecosystems and both current and future recreational users of McCoy WMA.

FOREST/WILDLIFE HABITAT GOALS

1. Maintain and improve wildlife habitat for both game and non-game species in alignment with the Iowa Wildlife Action Plan.
2. Diversify the forest both in terms of species makeup and age-classes/successional stages, with a special emphasis on Oaks as the keystone species as cited in Iowa Forest Action Plan
3. Protect high-quality habitat for all Species of Greatest Conservation Need (SGCN)
4. Maximize forest health by strengthening its resiliency in the face of new pests and diseases.
5. Maintain and enhance societal benefits provided by forests including, watershed protection, outdoor recreation, air quality, carbon sequestration and more.

McCoy Wildlife Management Area is located in Sections 21, 28, and 29 in Worth Township in Boone County, Iowa.

McCoy WMA comprises 360.2 total acres with 306.9 acres of it being forested (85%).

The McCoy WMA is located adjacent to Ledges State Park and the Saylorville Wildlife Area in Boone County, Iowa. The original tracts of land were acquired in 1938 and 1941 with the intentions of creating the State Game Farm. The core area of the McCoy WMA was acquired in 1964 from P.I. McCoy to be managed by the Iowa Conservation Commission as a Game Management Area. Prior to State ownership, the area was used for agricultural purposes; cattle and hogs grazed the woodland acres and the open areas were cultivated. In 2007 an additional 81 acres was acquired from Don Adams, Nancy Adams Ross, and the Estate of Harold Adams. The Adams tract was grazed by cattle prior to State ownership.

The McCoy WMA is currently managed as a diverse WMA with a balance of native prairie plantings, cropland, cool season hay, and woodland. The prairie portions are burned on a 3-5 year rotation. Portions of the woodland have been burned twice in the last 10 years to help control the spread of honeysuckle.

Reconnaissance surveys of McCoy WMA resources were conducted during the summer of 2024. The resulting data was analyzed after the reconnaissance was completed. From this, the property was divided into a number of stands. Each stand represents a homogeneous unit of land which will be managed in a specific way. Stand maps with stand descriptions and management recommendations were developed after discussions with the Manager. Generally, the DNR manages state-owned forest lands for timber, wildlife habitat diversity, recreation, and aesthetics. Major objectives of forest management for McCoy WMA are found in the Descriptions & Recommendations for Individual Stands section of this plan.

Other stewardship considerations that are incorporated into forest management decisions, based upon forest resource concerns, 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, hazard tree management, invasive

species management, protection of any identified special sites, and others. These considerations are detailed in the “Natural Resource Management Concerns” section of this plan.

The McCoy WMA Forest Stewardship Plan (FSP) will begin with a general forest resource and soil type description of the WMA area. Next, forest management objectives will be stated followed by general description of recommended management activities (Management Systems) designed to meet those objectives. Following this, Natural Resource Management Concerns are outlined. Finally, specific stand level forest management activities are recommended for each stand, according to management priorities and recommended time lines for completing the management work, when applicable.

The McCoy WMA FSP is a generalized guideline for recommended management work. Detailed silvicultural prescriptions will be developed immediately prior to doing scheduled or recommended management practices in order to consider unique stand conditions and more specific targeted wildlife habitat needs. These prescriptions will be in the form of detailed practice project plans developed with collaboration between the DNR District Forester and WMA Manager. A record of completed management activities will be kept on file at the area manager’s office so that practice evaluations can be made and compared to determine if management objectives are being met and proper practice follow-up is done to determine if and when more management is needed.

FOREST RESOURCE DESCRIPTION

The following McCoy WMA FSP details forest management recommendations for 306.2 forested acres. The McCoy forest management area has been divided into 19 management stands including 10 even age stands (154.9 acres), 3 viewshed stands (43.9 acres), 3 oak savanna/woodland stands (42.8 acres), 2 even age/oak savanna stands (60.5 acres), and 1 uneven age stand (4.7 acres) for management purposes.

See photo map for specific forest management stand locations in the Maps Section of this plan.

Upland Forested Stands (most stands on this property)

Most of the upland forests on this property are considered oak-hickory forest. The density of the overstory canopy can vary from closed canopy (forest) to open canopy (woodland) and anywhere in between. The understory and herbaceous layers are also highly variable due to different levels of sunlight penetration. Oak-hickory forests are dependent on regular disturbances of prescribed fire. Species like oak are specially adapted to fire because of their ability to repeatedly stump sprout after being top killed and because their heavy bark, as they get older, is fire tolerant. With frequent fires (4-6 years), this early successional community can be maintained indefinitely. All the common species are intolerant of shade and include: white oak, chinquapin oak, red oak, bur oak, black oak, shagbark hickory, and black walnut. Associated species include just about anything in the Central Hardwoods and Maple-Basswood forest types.

Bottomland Forested Stands (11 & 16)

These stands occur on somewhat poorly drained to moderately well-drained soils that are occasionally flooded with light scouring and alluvial depositions. Common species found in bottomland stands on this property include: black walnut, hackberry, elms, Kentucky coffeetree, honey locust, bur oak, red oak, chinquapin oak, bitternut hickory, cottonwood, and box elder. These bottomland stands range from poletimber to small sawtimber size classes. They are closed canopy and are generally fully stocked to overstocked.

NATURAL RESOURCE MANAGEMENT CONCERNS

Soil and Water Quality Protection

Continue to protect McCoy forest management areas from livestock grazing. Check boundary fences regularly. Livestock grazing, especially in a closed-canopy forest ecosystem, causes long term soil compaction that slows tree growth, enhances soil erosion, and over time, impairs overall forest health and tree vigor. Grazing destroys diverse wildlife ground cover and hinders the natural production of desirable tree species such as oaks, hickories, and black walnut trees. Grazing also greatly limits the effectiveness of woodland improvement practices such as thinning and weed tree removal.

BMP's (best management practices) will be implemented when doing woodland management work. The following are examples of practices called BMP's. Below, are some general considerations to be aware of to minimize soil erosion originating from a forest:

- Limit road access for management purposes to ridge tops if possible. If not, route them along or following natural land contours.
- Minimize the use of heavy, rubber-tired equipment in management areas.
- Protect sensitive areas like stream banks (riparian areas) by leaving forested buffer strips from 50 to 150 feet wide (depending on stream width and topography) next to streams. Management in these SMA's (stream bank management areas) should be limited to woodland understory and mid-story tree manipulation and selective overstory harvesting. Always try to maintain a minimum of 70% overstory canopy cover in SMA areas.
- Route trails along natural land contours.
- Minimize soil disturbance during logging or when implementing woodland improvement practices by cutting and dragging trees when the ground is dry, firm, or frozen. Felled tree tops can be left randomly scattered for short term wildlife habitat. Felled tree stems should be broken down into chunks that make complete ground contact for rapid decomposition to occur. If some are utilized for fuel wood, limit access to the area by tractors and vehicles to times when the ground is dry or frozen.
- Avoid piling trees and branches in stream channels.
- If bare soil areas are created or existing trails are not properly constructed, use soil stabilization practices to minimize the existing erosion hazard. These may include mulching, seeding, and building sediment control structures.

Soil Type	Drainage	Ecological Site	% Coverage
Hayden-Storden loam	well drained	loamy upland forest	44.3
Hayden loam	well drained	loamy upland forest	18
Hawick gravelly sandy loam	excessively drained	sandy upland prairies	13.8
Luther loam	somewhat poorly drained	loamy upland forest	8.5
Sattre loam	well drained	sandy upland savanna	7.3
Spillville-Buckney fine sandy loam	excessively drained	footslope/sandy floodplain	3.5
Buckney fine sandy loam	excessively drained	sandy floodplain	1.6
Hanlon fine sandy loam	moderately well drained	loamy floodplain	1.5
Moingona loam	moderately well drained	footslope/drainageway forest	0.8
Ames silt loam	very poorly drained	recharge depression	0.5
Dundas silt loam	poorly drained	loamy wet forest	0.2

Forest Insect and Disease Problems

Monitor the forest for obvious damaging disease and insect problems. Take special note of trees dying in pockets or groups. Currently, Dutch Elm Disease (DED) and Oak Wilt are the two major tree diseases observed in the McCoy forest management area. While not much can be done about controlling DED, and these two diseases are somewhat normal occurrences in forests in central Iowa, steps can be taken to lessen the spread of the oak wilt pathogen. Limiting the cutting or wounding of oaks to the time period of October 1 to March 31 each season is the prescription to follow for doing both TSI (timber stand improvement) and timber harvesting work.

With the advent of discovering the Emerald Ash Borer in Iowa, the majority of ash trees have succumbed to the insect. Most of the ash trees were green ash and there are more limited numbers of black ash. Currently, all of the green ash trees are dead but there are still some isolated areas where black ash survives.

Invasive Forest Plant Species

Sometimes exotic (non-native) plant species introduced into an ecosystem can become invasive and disruptive to the balance of a natural ecosystem. Exotic plant and animal species have the ability to out-compete native species and subsequently can cause a decline in biodiversity and ecosystem health. Such is the case with a host of non-native

invasive species within this area including: garlic mustard, autumn olive, bush honeysuckle, multiflora rose, white mulberry, black locust, Siberian elm, Japanese barberry, and reed canary grass along with others. Generally, these species can be controlled to manageable levels by mechanical removal, chemical pesticide applications, periodic controlled prescribed burning, or a combination of these management practices.

Hazard Tree management

Hazard trees carry a higher risk of structural failure which could cause property damage or personal injury. To be considered hazardous, a tree must have the following: 1) major structural defect(s) that make it more prone to failure and 2) a nearby target that it could land on such as a building, parked car, high use trail, etc. Larger, taller trees bear more weight and need to be monitored more frequently for structural decline in high-use areas. Hazard tree management, especially in and adjacent to “high use” areas of the WMA should be conducted continuously in accordance with policy to lessen or eliminate potential danger to parking lots and high use trails.

Wildlife Concerns

Forest management activities such as timber harvesting, thinning, burning, and tree planting can have both beneficial and/or detrimental effects to wildlife. The conscious decision to do no forest management (i.e., *hands off* management) can also affect wildlife. Such tradeoffs can be hard to quantify and understand due to the complexity of natural ecosystems. Iowa’s Wildlife Action Plan (IWAP) (available at www.iowadnr.gov) identifies *Species of Greatest Conservation Need* which are species that are rare, threatened, endangered, or declining in numbers in the state. Before any activities described in the plan are implemented, they will be studied by DNR environmental review staff to determine potential impacts to State and Federal threatened and endangered species.

Management activities will not be prescribed or initiated until the environmental review staff is satisfied that threatened and endangered species will not be threatened or negatively impacted. Since a major purpose of forest management is to provide a focal area for more effective and targeted bird and wildlife conservation management, this particular effort fits well with implementation objectives of the IWAP, providing an opportunity to develop an integrated, cooperative approach to delivering on-the-ground conservation, especially for Species of Greatest Conservation Need and also to “keep common species common”.

The activities recommended in this plan are meant to optimize the overall diversity and quality of wildlife habitat for both common wildlife species as well as those that need habitat protection and restoration.

State and Federal Threatened or Endangered Species

Threatened and endangered plant and wildlife species and their habitats must be protected when conducting woodland management activities. Forested areas of the McCoy WMA management area may be suitable for summer Indiana Bat, Northern Long Eared (NLEB), or Tricolored bat habitat.

The Indiana Bat (*Myotis sodalis*) is a federal (50 CFR Part 17) and state (Code of Iowa, Chapter 481B) endangered species that occurs in southern Iowa as far north as Highway 30. The Northern Long-Eared Bat (*Myotis septentrionalis*) is a federally Endangered Species that can occur in any county of Iowa. The Tricolored Bat (*Perimyotis subflavus*) is a federally Proposed Endangered Species that can occur in any county in Iowa. All three bats can be active from April through September in forested areas. Female Indiana bat and Northern Long-Eared Bats may roost and rear young in standing trees 3” DBH and larger, either dead or alive, with loose, shaggy, or peeling slabs of bark, cavities in the trunk or large limbs, or large cracks or openings. Tricolored bats roost in similar forested habitat but roost within leaf clusters instead of under loose bark.

To protect summer habitat for all three species of bats, adhere to the following guidance:

- Avoid felling any dead standing or live trees 3” DBH and larger that contain cavities, cracks or crevices, or loose, platy, peeling, or shaggy bark from April 1 through September 30.
 - Such trees meeting the above criteria may be felled beginning October 1 through March 31; however, in all forest management projects, retain a minimum of 9 suitable habitat trees per acre if present above this rate.
 - Live trees may be girdled any time of year to create habitat snags in Forest Stand Improvement operations.
- Avoid conducting prescribed burns in woodlands from April 1 until September 30.

- If prescribed burning operations must take place after April 1 through September 30, then protect trees 9" DBH and larger that contain cavities, cracks or crevices, or loose, platy, peeling, or shaggy bark.
- Avoid clearcuts, seed tree harvests, or site preparation projects larger than 10 acres that could negatively affect suitable habitat.

If the above guidance cannot be adhered to, an individual consultation with the U.S. FWS Rock Island Field Office is needed to determine how to best avoid adverse effects to Indiana Bat, Northern Long-Eared Bat, and/or Tricolored Bat.

For a complete current listing of threatened and endangered plant and wildlife species in Iowa, please check the Iowa DNR's [Natural Areas Inventory website](#).

Special Sites

Every effort will be made to identify and protect natural resources and man-made "special sites" before and during forest management work. Sites that are historical and cultural resources include such things as buildings and structures of historical significance, human burial sites, special land features, and artifacts. If such things are ever observed or discovered, those sites will be located, preserved, and avoided when implementing forest management activities.

Human remains that are discovered or accidentally uncovered must be reported to local law enforcement officials. This reporting is required by Iowa Code 558.69. Discovered artifacts or structures of suspected historical significance will be reported to the State Archaeologist and the discovery will be protected.

The following are practices that will help minimize the chances of accidentally destroying items of cultural or historical significance when doing forest management work:

- Thoroughly inspect a project area before working. Look for unusual looking areas such as obvious mounds or groups of mounds, or square and rectangular shaped depressions or extrusions.
- Minimize ground disturbance when tree planting, logging, and doing forest stand improvement work. Cut trees and use heavy equipment only when the ground is frozen, dry, or firm.
- Be especially careful of disturbing soil around streams, lakes, and riparian (stream bank) areas.
- Locate trails and management access roads along natural land contours.

Timber Harvesting

All timber harvesting will be done to promote the sustainability of future forest benefits according to McCoy WMA's management objectives. All commercial timber harvesting planning and work will be done according to state-owned land guidelines, policies, and rules, under the supervision of the Iowa DNR State Forester and the McCoy WMA Supervisor.

Use of Pesticides

All pesticides will be stored, handled, and applied according to product labeling to maximize effectiveness and to minimize damage to the environment and danger to applicators. It is a violation of Federal Law to store, handle, and apply pesticides inconsistent with product labeling. For all pesticide treatments, always try to minimize chemical contact with non-target plant, animal, and bird species.

FOREST MANAGEMENT OBJECTIVES

The primary management objectives for the McCoy forest management area is to improve wildlife habitat for a variety of wildlife species, to provide recreational opportunities, to provide clean water, and to protect endangered wildlife species and "species of greatest conservation needs". Keeping and improving the health and vigor of a diverse (tree species diversity) forest ecosystem is the key to optimizing benefits for the widest variety of wildlife species and recreational uses.

Maintaining healthy, diverse forested stands, with good reproductive potential of desirable tree species, is essential to the successful management of the McCoy forest management area. Management targeted to keeping forested stands at proper tree stocking levels will improve and maintain forest health and sustained, long-term wildlife mast (nuts, acorns) production.

Periodic forest overstory thinning and weed tree removal will improve forest health and vigor and can improve wildlife mast production by as much as seven-fold in one thinning cycle. Oak crop tree diameter growth rates can also be doubled in one thinning cycle, also improving tree health, vigor, and mast production.

Management treatments, such as periodic suppressed tree canopy level thinning and periodic controlled forest understory burning, will help control undesirable and invasive plant species and increase forest understory light levels to improve wildlife understory cover and make conditions more favorable for the natural reproduction of desirable tree species such as oaks, hickories, and black walnuts.

Finally, when timber harvesting is recommended as a forest regeneration system, even-aged harvest systems such as “shelterwood”, “group selection”, and “patch clearcutting” are the best methods to use for regenerating the majority of the crop tree species found on the McCoy WMA forest management area, and for maintaining a healthy, diverse, and quality forest ecosystem.

PROPOSED MANAGEMENT SYSTEMS FOR MCCOY 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 pages.

Management System	Acres	% of Total Acres
Early Successional	0	0
Even Age	155	50.5
Uneven Age	4.7	1.5
Oak Savanna/Woodland	103.3	33.7
Viewshed	43.9	14.3
Total	306.9	100

Even-Aged

Even-aged stands are characterized as having an overstory canopy of trees that are all nearly the same age, even though diameter classes may be different due to stand tree stocking levels and individual tree species growth rates.

Even-aged management, when applied at the appropriate scale, can have positive effects on improving habitat for many wildlife species. Larger stands can be divided into smaller stands or blocks to provide for age class diversity when needed. Even-aged management creates stages of excellent habitat for deer, turkeys, and other wildlife species and is essential for the regeneration of oaks, hickories, and black walnuts, which require full sunlight.

Management practices included with even-aged management:

- Periodic overstory thinning to reduce crowded stands to the proper stocking levels. Usually, specific practices include basal area thinning, crop tree release thinning, and weed tree removal. These practices improve crop tree diameter growth rates, mast production, and improve overall forest health and vigor to help minimize forest insect and disease problems.
- Periodic suppressed canopy tree removal is prescribed to improve forest understory light conditions; usually in pole-sized tree stands to improve understory cover for wildlife. For stands being considered for sawtimber harvesting, suppressed canopy tree removal and weed tree removal are necessary pre-harvest or post-harvest treatments to help make conditions favorable for the establishment of desirable tree species, both natural and planted.
- Periodic controlled understory burning is prescribed to improve wildlife ground cover and to help control unwanted and invasive tree and plant species in forest understories or along forest edges.

- Shelterwood, clearcutting, and group selection tree harvest systems, with or without additional tree planting, are recommended as the only suitable harvest systems for regenerating oaks. The shelterwood system is really a two-cut harvest system that is often used to help develop a population of desirable tree seedlings on the ground before the final overstory removal cut.
- Savannas and stands composed of coppiced (sprout origin) hardwoods are also types of even-aged management systems.

Uneven-Aged

Uneven-aged management develops a stand of trees with all tree sizes represented. 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 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 understory is mainly hard maple, 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. 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 for many wildlife species. Timber stand improvement and selective harvesting will create woody debris on the forest floor for reptiles and amphibians.

Viewshed

Viewshed areas are typically steep slopes and areas along streams and lakes which can be fragile sites, or sites that enhance the aesthetic recreational quality of the area. Mostly, these sites are best left to naturally progress through succession or only receive light, less invasive management. Areas having observed and documented endangered plant or animal species existing are also candidates for viewshed management.

Early Successional

Species of birds such as American woodcock, golden-winged warbler, blue-winged warbler, black-billed cuckoo, yellow-billed cuckoo, and eastern towhee are dependent on the young, dense woody growth. High stem densities of trees and shrubs provide suitable nesting habitat and protection from predators. These stands are usually associated with aspen stands, but in the absence of aspen can be any hardwood stand of mixed or pure species that will be managed for 15-20-year rotations by clearcutting and allowed to re-sprout.

Edge feathering is a type of ES management along forest/field edges where tree cover is periodically cut (felled) to promote a transition of weedy, brushy cover between forest and field cover. This typically benefits bobwhite quail and sometimes woodcock.

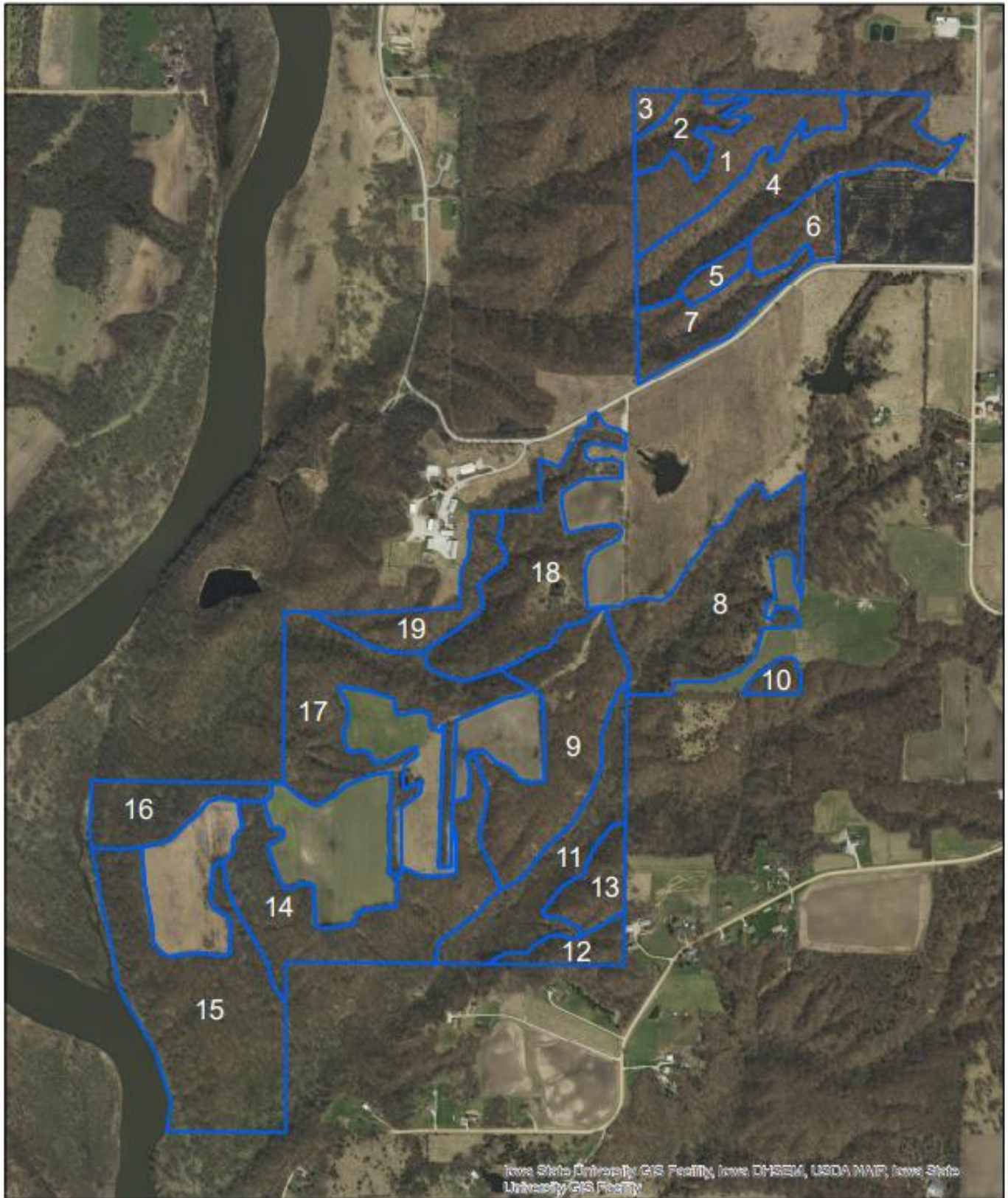
Oak Savanna and Oak Woodland

Oak savannas and oak woodlands definitions vary among natural resource professionals but there are common threads through them all. They are dominated with oak overstories, insignificant mid-story canopy trees, sparse areas of woody shrubs, and a diverse understory of grasses, sedges, and forbs. These communities were historically prominent in regions that were maintained by frequent fires. Savannas and woodlands are much less prominent presently, due to fire suppression, allowing them to transition to forests. Clearing land for agricultural uses is also a major factor in the decline of these ecosystems. Many bird species benefit from oak savanna and oak woodlands including the blue-winged warbler, eastern towhee, eastern wood-pewee, field sparrow, prairie warbler, northern bobwhite, red-headed woodpecker, and many more.

Management for savannas and woodlands is much the same as even age management. They will include the same types of thinning to open the canopy that is associated with conducting a shelterwood. The difference is there will not be a final clear-cut harvest. The open canopy conditions will be maintained by prescribed fire and occasional thinning.

MAPS SECTION

McCoy WMA Stand Map



925 462.5 0 925 Feet

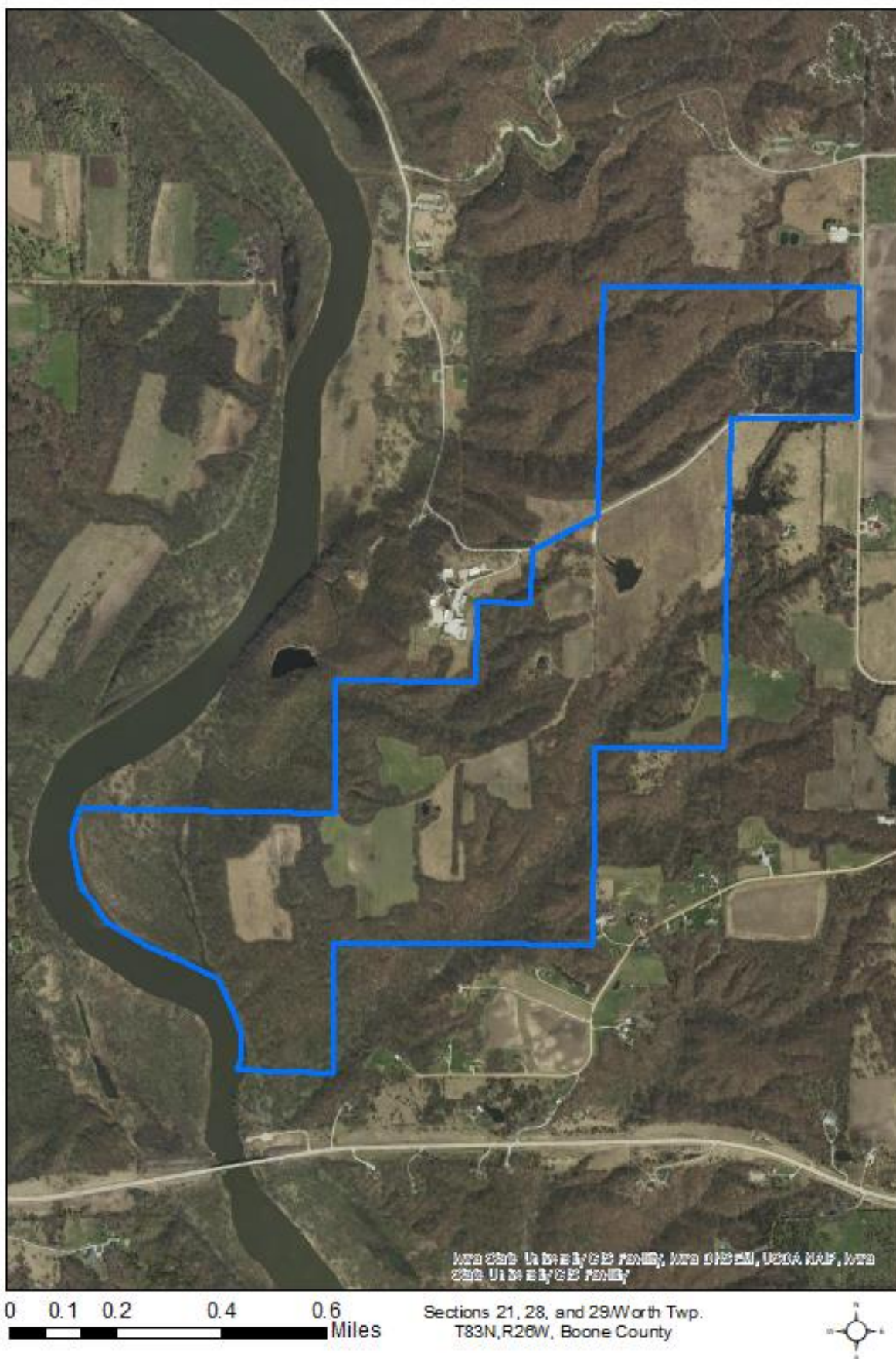


Section 21, 28, and 29/Worth Twp.

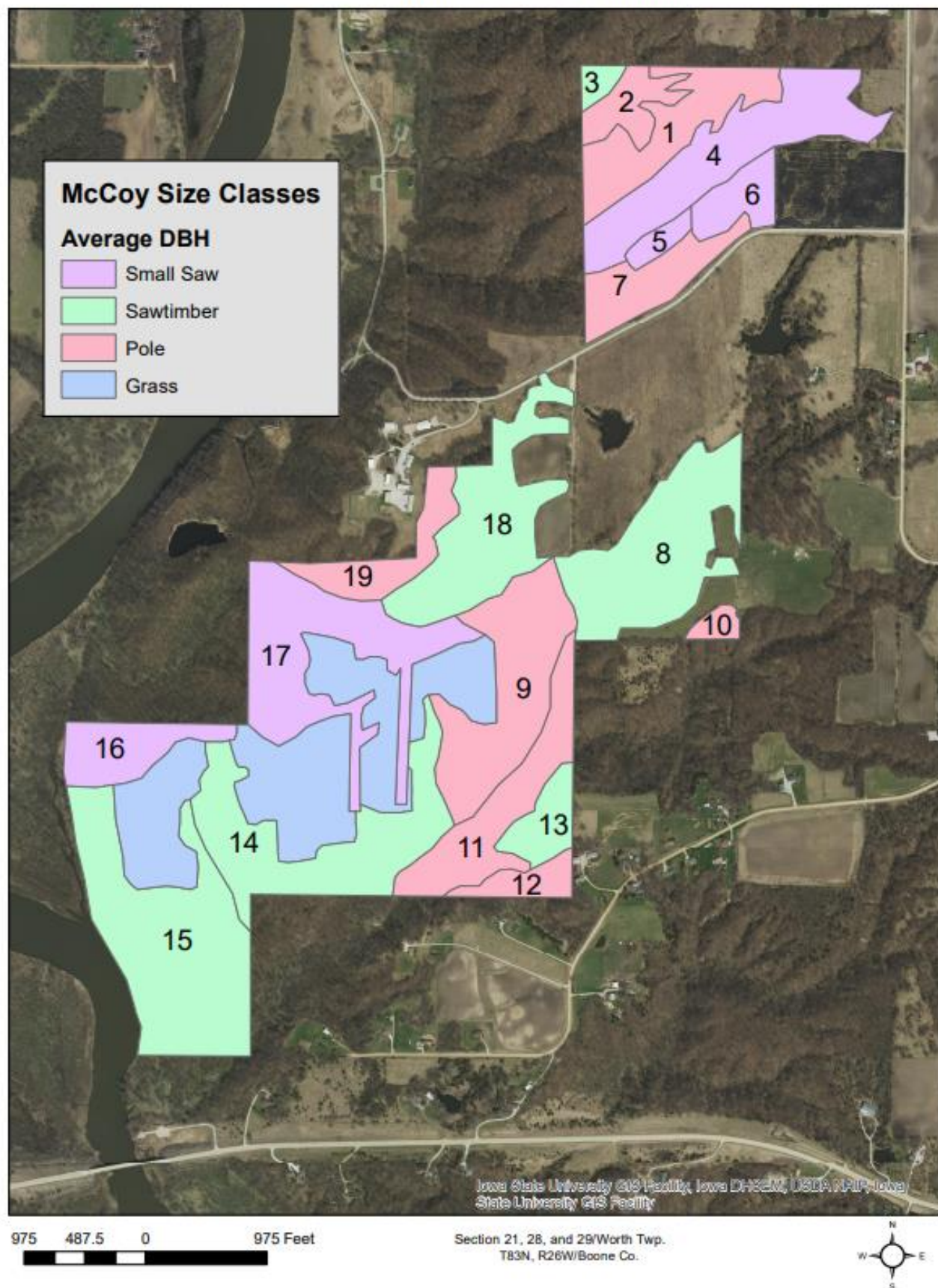
T83N, R26W/Boone Co.



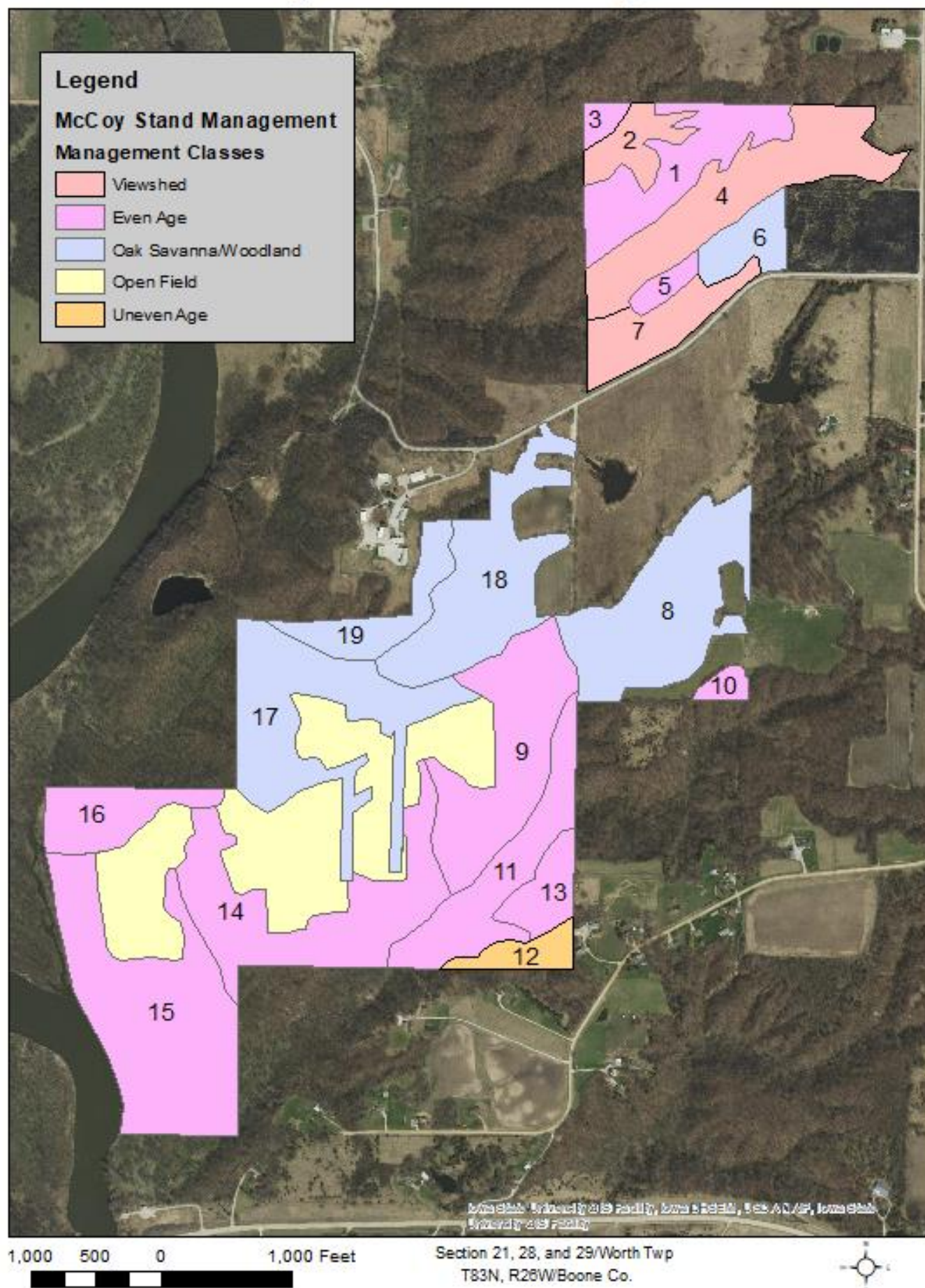
McCoy WMA Property Boundary Map



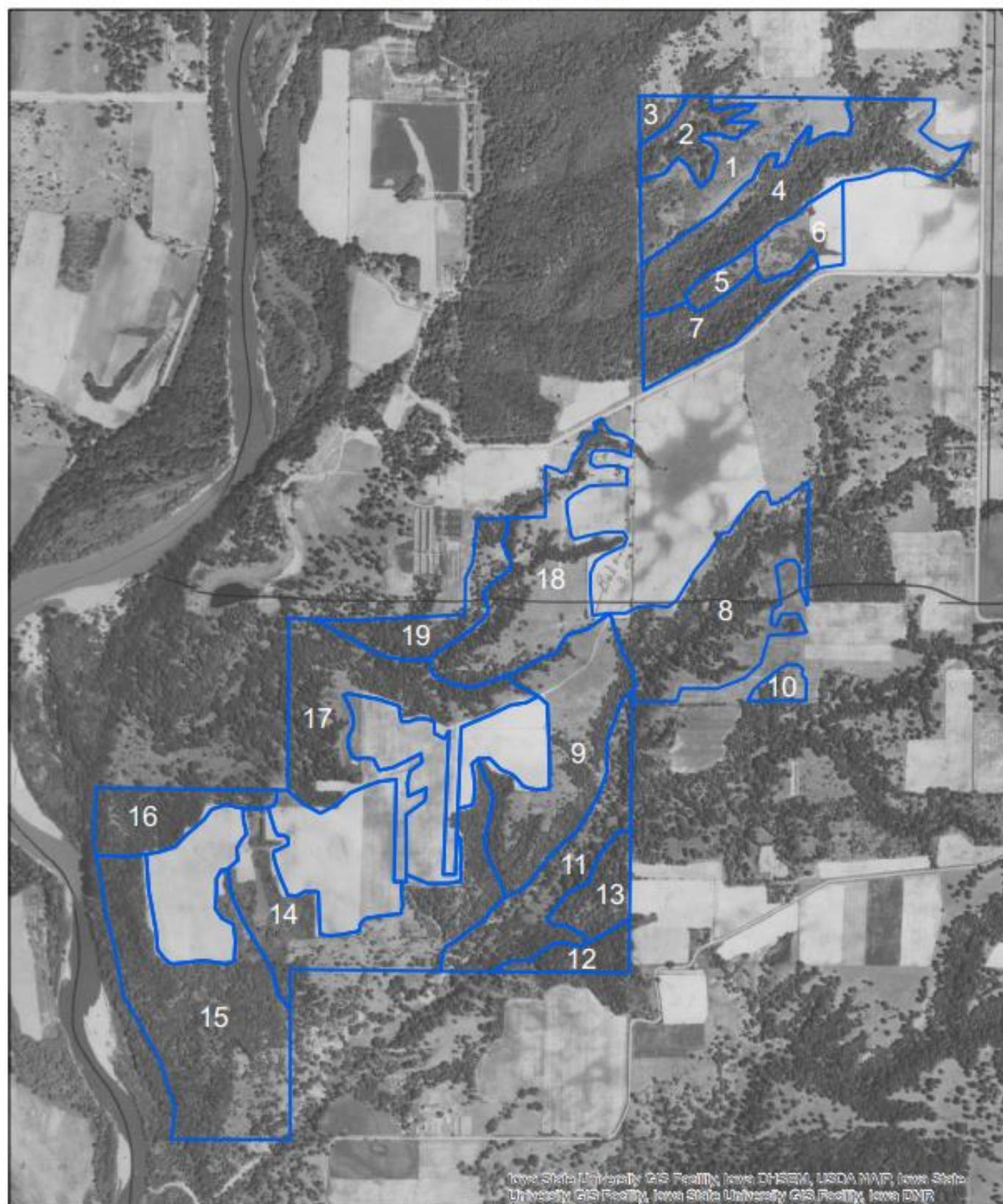
McCoy WMA Size Class Distribution



McCoy WMA Stand Management



McCoy WMA 1930's Map



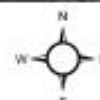
Iowa State University GIS Facility, Iowa DNR, USDA NRP, Iowa State University GIS Facility, Iowa State University GIS Facility, Iowa DNR

925 462.5 0 925 Feet



Section 21, 28, and 29/Worth Twp.

T83N, R28W/Boone Co.



CURRENT DISTRIBUTION OF TREE SIZE AT MCCOY WMA

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

Tree Size Class	Acres	% of Total Area
Sapling	0	0%
Pole Size	45.1	14.7%
Small Sawtimber Size	54.6	17.8%
Sawtimber Size	207.2	67.5%
Total	306.9	100%

DESCRIPTIONS & RECOMMENDATIONS FOR INDIVIDUAL STANDS

Regardless of specific management objectives, active management is needed to keep Iowa forests healthy, sustainable, and renewable. Keeping state-owned forest properly stocked with desirable tree species and protected from external damaging influences is key to the sustainability of Iowa's forest resources.

Stand 1: 16.7 acres

Stand Description

This stand is located on a flat ridgetop with easy access. It is basically a two aged stand with mature open grown basswood, white oak, red oak, bur oak, and bitternut hickory along with pole size black walnut, bitternut hickory, red oak, white oak, basswood, and shagbark hickory. On the west end of the stand, are some really nice black walnut trees in the sawtimber size class. It is an overstocked stand with an average basal area around 120 square feet per acre. The understory and mid-story have a lot of ironwood throughout. Natural regeneration observed was mostly ash and hackberry. Invasive species are found in medium to heavy populations in certain areas. The invasive species include autumn olive, multiflora rose, Japanese barberry, and honeysuckle.

Soil type

Hayden loam

Recommendations (Even Age Management)

This stand needs invasive species control, an overstory thinning, and mid-story removal. Invasive shrub removal should be completed first or at the same time as the overstory thinning and mid-story removal. Use cut stump treatment for the invasive shrubs and ironwood being sure to utilize herbicide on stumps. Prescribed fire could be utilized to keep invasive species to a minimum and also encourage native understory vegetation.

Stand 2: 6.7 acres

Stand Description

This stand is a steep ravine and is located between stands 1 and 3. The ravine generally runs from northeast to southwest. The hillside that is south facing has an overstory of basswood, red oak, black maple, white oak, chinquapin oak, bitternut hickory, and shagbark hickory. The north facing side of the ravine has an overstory of mostly basswood, ash, black maple, Kentucky coffee tree, and red oak. The mid-story has a mix of ironwood and American hornbeam. There is a light infestation of some invasive shrubs including barberry, autumn olive, and honeysuckle.

Soil Type

Hayden-Storden loam

Recommendations (Viewshed Management)

No management is necessary except for invasive species control. Fire can be used in this stand if an adjoining stand is being burned.

Stand 3: 2 acres

Stand Description

This is a small stand located in the northwest corner of the WMA. It is not easily accessible except for its border with Ledges State Park. The overstory is mainly mature white oak, red oak, and shagbark hickory. The average basal area is 110 square feet per acre. The mid-story has a healthy population of ironwood, and has a light infestation of autumn olive. A few serviceberry trees were observed.

Soil Type

Hayden loam, Hayden Storden loam

Recommendations (Even Age Management)

An overstory thinning, along with a mid-story removal of ironwood and autumn olive, could be conducted if time ever allows. Periodically burn this area. Since it is more easily accessed from the Ledges side, thinning and burning could be conducted in conjunction with the adjacent stand on the Ledges property.

Stand 4: 26.3 acres

Stand Description

This is another steep ravine area. The size class of the overstory trees range from poletimber to large sawtimber sizes. The average basal area is around 90 square feet per acre. The north facing slopes have an overstory of red oak, basswood, black maple, and bitternut hickory. The south facing slopes have the same species as the north facing slope but also includes white oak and chinquapin oak. The understory and mid-story have ironwood, blue beech, autumn olive, ferns, and shade tolerant natural regeneration like black maple and ash.

Soil Type

Hayden loam

Recommendations (Viewshed Management)

No management is necessary except for invasive species control. Fire can be used in this stand if an adjoining stand is being burned.

Stand 5: 2.5 acres

Stand Description

The overstory of this stand is dominated by mature white oak, but also contains other species in poletimber to sawtimber sized classes such as shagbark hickory, black cherry, basswood, and red oak. The stand is overstocked, and has an average basal area of 160 square feet per acre. The mid-story has a healthy population of ironwood throughout and autumn olive in certain areas. The understory is somewhat grassy in areas and has natural regeneration including ironwood and ash.

Soil Type

Hayden loam

Stand Recommendations (Even Age Management)

This stand needs invasive species control, an overstory thinning, and mid-story removal. Invasive shrub removal should be completed first or at the same time as the overstory thinning and mid-story removal. Use cut stump treatment for the invasive shrubs and ironwood being sure to utilize herbicide on stumps. Prescribed fire could be utilized to keep invasive species to a minimum and also encourage native understory vegetation.

Stand 6: 6.7 acres

Stand Description

This stand is located on flat ground, and borders an open field that is to the east of the stand. Walking through this stand, it is apparent that this was once a more open area and possibly pastured. Looking at the old aerial photos it is clear it was more open. The overstory has scattered mature white oak, red oak, shagbark hickory, and basswood. On the east end of the stand, there is a pocket of poletimber to small sawtimber size red oak and white oak that are mostly

multi-stemmed. The average basal area of the pocket of oaks is 170 square feet per acre. Most of the stand is really thick with invasive shrubs including autumn olive and multiflora rose. There is quite a bit of natural regeneration of mostly ash seedlings.

Soil Type

Hayden loam, Hayden-Storden loam, Ames silt loam, Luther loam

Stand Recommendations (Oak Savanna/Woodland Management)

This stand is so thick with brushy invasive species that this area would be a good candidate for a forestry mower. This should be followed up with herbicide spraying the stumps and/or the sprouts that grow back. Following the invasive species control, this stand could be burned periodically. The pocket of trees should be thinned to a basal area of around 80-90 square feet per acre.

Stand 7: 10.9 acres

Stand Description

This stand is mostly a steep ravine located between stands 5 and 6 to the north and a road to the south. The overstory of this stand is a mix of red oak, black maple, white oak, shagbark hickory, chinquapin oak, and basswood. The mid-story has a lot of ironwood, and the understory has an abundance of ash regeneration. There are areas on the slopes that are bare soil. There are a lot of invasive honeysuckle and autumn olive shrubs along the road.

Soil Type

Hayden-Storden loam

Stand Recommendations (Viewshed Management)

Invasive species control should be a priority especially along the road. Ironwood removal would help with getting more vegetation established where bare soil is present. Fire can be utilized here when and if stand 5 and 6 are burned.

Stand 8: 29.4 acres

Stand Description

This is a highly disturbed stand. It seems to have been high graded in the past and was likely heavily grazed. It has a ravine that is moderately steep along with flat areas at the top of the slopes. The overstory is mainly widely dispersed large sawtimber trees with species such as red oak, white oak, black walnut, cottonwood, basswood, and honey locust. Some flat areas have good potential for savanna restoration due to the presence of big openly grown white oaks. The average basal area is about 40 square feet per acre. Red cedar pockets can be found in different areas especially in the gentle upper slope and flat areas. There are also some pockets of nice black walnut trees that have very good potential. Invasive species are very heavy in this stand. Invasive species include honeysuckle, autumn olive, and multiflora rose. Along with the invasive shrubs the mid-story also includes ironwood. There is a lot of natural regeneration present but it is mostly ash seedlings.

Soil Type

Hayden-Storden loam, Luther loam, Hayden loam

Stand Recommendations (Even Age/Oak Savanna Management)

Invasive species control should be the first step in this stand. The flat areas on the top could be cleared a great deal using a forestry mower following up with herbicide treatment. The invasive shrubs on the slopes and in the ravine will need to be hand cut and treated with herbicide. After the bulk of the invasive shrubs are removed on the upper oak flats, then fire can be used to help control any remaining invasive vegetation and also improve native vegetative diversity for savanna restoration. Once invasive shrubs are removed from the steep ravine area, new tree seedlings can be planted throughout. Also, release any nice walnut crop trees.

Stand 9: 26.8 acres

Stand Description

The overstory of this stand is predominately in the poletimber to small sawtimber size class and includes many species including red oak, chinquapin oak, black walnut, white oak, shagbark hickory, bitternut hickory, hackberry, honey locust, black cherry, red cedar, basswood, and American elm. There are also pockets of mature white oak on spur ridges and mature red oak, white oak, and chinquapin oak on the southeastern facing slope. The average basal area is 120 square feet per acre. The mid-story and understory regeneration contains mostly shade tolerant seedlings and saplings including ironwood, hackberry, elm, and ash. Invasive species are throughout and areas range from light to heavy infestation. Invasive species include autumn olive, multiflora rose, honeysuckle, and Japanese barberry. There are some very heavy populations of autumn olive with some small openings and the forest edge along the access road that goes through the middle of the stand.

Soil Type

Hayden-Storden loam, Luther loam, Hayden loam, Dundas silt loam

Stand Recommendations (Even Age Management)

Management for this stand will be to conduct a crop tree release of all the nice pole and small sawtimber size oaks and walnuts. Areas between crop trees should have a basal area reduction down to 70 square feet per acre. Before or at the same time as the thinning, invasive shrubs should be killed with the cut stump method. The heavy pockets of autumn olive could be targeted with a forestry mower.

Stand 10: 2 acres

Stand Description

This is a small stand that borders an open field on the state land side and borders a forest to a private landowner. It does not border any other stand in this plan. The overstory consists of mostly pole size trees and would be considered a hard maple/basswood stand. There are also pole size white oak and red oak mixed in. The slopes contain some chinquapin oak along with pole size shagbark hickory. The understory contains a lot of ironwood and a moderate amount of honeysuckle and autumn olive.

Soil Type

Hayden-Storden loam, Ames silt loam, Luther loam

Stand Recommendations (Even Age Management)

Conduct a crop tree release of the nice pole size oaks and control invasive shrubs and ironwood.

Stand 11: 17.6 acres

Stand Description

This is a bottomland stand with a creek that runs the length of it from northeast to southwest. The overstory contains nice poletimber and small sawtimber size trees with species including black walnut, hackberry, red elm, black cherry, Kentucky coffeetree, chinquapin oak, red oak, and honey locust. There are a few rare red mulberries throughout, and one really nice butternut tree was observed that doesn't appear to have any cankers. Trees in the southern one third of the stand are a little bigger, and there is a higher concentration of black walnuts. The average basal area is around 120 square feet per acre. The understory contains a dense population of nettle in areas. Invasive species are present mostly in the northern two thirds of the stand. The invasive species infestation is light to medium and the species that are present are autumn olive, honeysuckle, multiflora rose, and barberry. Ironwood is also prevalent in this part of the stand.

Soil Type

Spillville-Buckney Complex, Hayden-Storden loam

Stand Recommendations (Even Age Management)

Conduct a crop tree release of nice black walnut, oak, Kentucky coffeetree, red mulberry, and butternut. Kill invasive shrubs and remove the ironwood mid-story.

Stand 12: 4.7 acres

Stand Description

This stand is located on the southern end of the property, and is on a hillside that is not easily accessible for management. It is mostly a north facing slope with overstory species such as black maple, elm, red oak, and white oak. There are a lot of downed trees due to the 2020 derecho so it is difficult to walk through in those areas. There is some natural regeneration of black maple and hackberry saplings. There are a couple pockets of bladdernut in the understory. Invasive species such as honeysuckle, multiflora rose, and barberry are present.

Soil Type

Hayden-Storden loam

Stand Recommendations (Uneven Age Management)

Except for the possibility of invasive species control, no management needs to be done in this stand for now. This stand will be left to recover from the derecho by allowing natural regeneration to grow.

Stand 13: 6.4 acres

Stand Description

Like stand 12, this stand is not easily accessible. It is a west facing slope that is located just north of stand 12 and also borders stand 11. The overstory is mostly mature sawtimber size bur oak, red oak, basswood, and black maple. The mid-story has an abundance of sapling size ironwood and black maple. Invasive species that are present include garlic mustard, honeysuckle, and autumn olive.

Soil Type

Hayden-Storden loam

Stand Recommendations (Even Age Management)

This stand is transitioning from an oak forest to a maple basswood dominated forest. To keep this stand oak dominated into the future, prescribed fire should be introduced to help control the shade tolerant saplings and the invasive shrubs that are showing up. After a few fires there should be a noticeable difference in shade tolerant sapling and invasive species populations. Also, conditions should be better for oak regeneration.

Stand 14: 29.4 acres

Stand Description

This stand has an overstory of mostly white oak, red oak, and black walnut. It is classified as a sawtimber size stand, but the size of trees ranges from poletimber to over mature sawtimber size white oak. Other overstory trees include chinquapin oak, hackberry, honey locust, red elm, bitternut hickory, and shagbark hickory. There are some nice walnuts in this stand with a possibility of a harvest in the near future. Many areas of the stand have a heavy population of ironwood in the mid-story. There is a light to medium infestation of invasive honeysuckle.

Soil Type

Hawick gravelly sandy loam, Hayden-Storden loam, Sattre loam,

Stand Recommendations (Even age management)

An overstory thinning would benefit many poletimber size trees in this stand. At the same time other areas with pockets of mature white oak need a mid-story removal to make conditions better for future oak regeneration. Prescribed fire would benefit this stand by controlling invasive species, encourage more native vegetation, keep shade tolerant tree seedlings to a minimum, and create better conditions for oak regeneration. A tree harvest is possible in the next few years that would remove declining walnut trees and trees that will make conditions in certain areas better for oak regeneration.

Stand 15: 41.1 acres

Stand Description

This is a mature stand with an overstory of white oak, bur oak, and red oak but also includes black walnut, black maple, bitternut hickory, basswood, and shagbark hickory. There are also a few red mulberry trees but they are not prevalent throughout the stand. The average basal area is about 110 square feet per acre. The mid-story is thick with shade tolerant species such as ironwood and hackberry in the sapling and poletimber size classes. Natural regeneration is plentiful with about 8,000 seedlings per acre. Most of the natural regeneration are shade tolerant species including black maple, hackberry, and bitternut hickory. Invasive honeysuckle and autumn olive are present but are a light infestation. Most of the invasive shrubs are along the field edge. There are a few pockets of oak wilt that are affecting red oak trees.

Soil Type

Hawick gravelly sandy loam, Sattre loam, Hanlon fine sandy loam, Buckney fine sandy loam

Stand Recommendations (Even Age Management)

This stand is ready for the first step in a shelterwood process. The first step is to conduct a mid-story removal of all the shade tolerant trees. Along with the mid-story removal, some overstory trees could be thinned out, which could include trees large enough for a commercial harvest. Following the mid-story removal this stand should be burned periodically to encourage conditions for oak regeneration.

Stand 16: 10.5 acres

Stand Description

This stand has an overstory of black walnut, red oak, bitternut hickory, Kentucky coffeetree, and honey locust. The sized class is small sawtimber, but is on the verge of being considered a large sawtimber stand. The average basal area is about 110 square feet per acre. The trees in this stand are straight, tall, and vigorous. Vegetation in the understory is mainly coralberry and itch weed.

Soil Type

Hawick gravelly sandy loam, Hanlon fine sandy loam, Buckney fine sand loam

Stand Recommendations (Even Age Management)

Even though it is a sawtimber stand, it would respond well to an overstory thinning. Do not thin to below 70 square feet per acre. It's a possibility that some of the trees required to be killed could be commercially harvested. They could be harvested at the same time another stand is being harvested.

Stand 17: 31.1 acres

Stand Description

This stand is on the northern side of the property and encompasses a combination of ridgetop, steep slopes, and ravines. The area appears to have been partially pastured in the past. The overstory has a variety of species including white oak, black walnut, bur oak, and black maple. There is also a nice pocket of sawtimber size bigtooth aspen. The mid-story contains shade tolerant saplings such as ironwood and hackberry. The understory has a large amount of gooseberry and in areas the oak regeneration is good.

Soil Type

Hayden-Storden loam, Hayden loam

Stand Recommendations (Even Age or Oak Savanna/Woodland Management)

Mid-story removal along with some overstory thinning is needed to encourage the oak regeneration that has already gotten a hold in certain areas. Prescribed fire periodically would keep shade tolerant trees from taking over and improve conditions for more oak regeneration.

Stand 18: 26.5 acres

Stand Description

Looking at the old aerial photos this was much more open and only about half was forest cover. Currently this stand is heavily overgrown with large autumn olive and multiflora rose. Most of the invasive shrubs are growing above head high and thick enough it can't be walked through in most areas. There is a small pond in an area that is supposed to be open that didn't show up in the old aerial photos until the 1960s. The trees that are present are scattered open grown mature white oak, red oak, and basswood with pockets of poletimber size honey locust, elm, basswood, shagbark hickory, bitternut hickory, and red oak. The basal area average is about 90 square feet per acre.

Soil Type

Hayden-Storden loam, Hayden loam, Luther loam

Stand Recommendations (Oak Savanna/Woodland Management)

The first thing that needs to be accomplished before anything else is the invasive species control. Most of the area is flat enough that a lot of it can be removed with a forestry mower. Make sure to spray the stumps with herbicide or the sprouts when they come back. Once invasive species are greatly diminished then a timber stand improvement that focuses on releasing nice oak and hickory trees can happen. Eventually fire could be introduced to help convert and maintain this area to oak savanna/woodland like conditions.

Stand 19: 9.6 acres

Stand Description

This stand shares a border with the Boone Wildlife Research Station's prairie area. The overstory has a lot of pole sized trees with species such as red oak, black walnut, basswood, hackberry, black maple, white oak, and some chinquapin oak. There are also some scattered mature red oak and bur oak trees. The average basal area is around 100 square feet per acre. The natural regeneration is about 6,000 seedlings per acre and includes ash, ironwood, and some oak. Ironwood is thick in the mid-story and understory. Invasive honeysuckle and autumn olive populations are heavy in some areas.

Soil Type

Hayden-Storden loam

Stand Recommendations (Oak Savanna/Woodland Management)

Cut and treat all large invasive shrubs along with ironwood. Crop tree release nice oak and black walnut pole size trees. Burn this stand when the adjacent prairie is burned.

PROPOSED PROJECT COMPLETION SCHEDULE

Stand Summary and Recommendations

Stand	Acres	Overstory	Size Class	Management System	Recommendations	Priority
1	16.7	white oak, red oak, basswood, bur oak, bitternut	sawtimber	even age	invasive control, FSI thinning	H
2	6.7	basswood, red oak, black maple, white oak, chinquapin oak, bitternut, shagbark	sawtimber	viewshed	invasive control, fire	L
3	2	White oak, red oak, shagbark	sawtimber	even age	FSI thinning, burn	M
4	26.3	red oak, basswood, black maple, bitternut	sawtimber	viewshed	invasive control, burn	L
5	2.5	white oak, shagbark, black cherry, basswood, red oak	sawtimber	even age	invasive control, FSI thinning, burn	H
6	6.7	white oak, red oak, shagbark, basswood	poletimber	oak savanna/woodland	invasive control, burn	H
7	10.9	red oak, black maple, white oak, shagbark, chinquapin oak	sawtimber	viewshed	invasive control, ironwood removal, burn	L

Stand	Acres	Overstory	Size Class	Management System	Recommendations	Priority
8	29.4	red oak, white oak, black walnut, cottonwood, basswood, honey locust	sawtimber	even age/ oak savanna	invasive control, burn, tree planting, CTR	M
9	26.8	red oak, chinquapin oak, black walnut, white oak, shagbark, bitternut, hackberry, honey locust, black cherry, red cedar, basswood, elm	poletimber	even age	FSI thinning, invasive control	H
10	2	black maple, basswood, white oak, red oak	poletimber	even age	invasive control, FSI thinning	M
11	17.6	black walnut, hackberry, red elm, black cherry, Kentucky coffeetree, chinquapin oak, red oak, honey locust	small sawtimber	even age	invasive control, FSI thinning	H
12	4.7	black maple, elm, red oak, white oak	sawtimber	uneven age	invasive control	L
13	6.4	bur oak, red oak, basswood, black maple	sawtimber	even age	burn	L
14	29.4	white oak, red oak, black walnut	sawtimber	even age	FSI thinning, burn, harvest declining trees	H
15	41.1	white oak, bur oak, red oak, black walnut, black maple, bitternut, basswood, shagbark	sawtimber	even age	start shelterwood harvest process	H
16	10.5	black walnut, red oak, bitternut, Kentucky coffeetree, honey locust	small sawtimber	even age	FSI thinning, commercial thinning	H
17	31.1	white oak, black walnut, bur oak, black maple	sawtimber	even age/ oak savanna	FSI thinning, burn	H
18	26.5	white oak, red oak, basswood, honey locust, elm, basswood, shagbark, bitternut, red oak	small sawtimber	oak savanna/ woodland	invasive control, burn	H
19	9.6	red oak, black walnut, basswood, hackberry, black maple, white oak, chinquapin oak	poletimber	oak savanna/ woodland	FSI thinning, burn	M

SPECIES OF GREATEST CONSERVATION NEED

The Iowa DNR's *Iowa Wildlife Action Plan (IWAP)* identifies certain wildlife species as species of "greatest conservation needs". Management activities must always take into consideration these Species of Greatest Conservation Need, and also to "keep common species common."

Common Name	Scientific Name	Habitat Preference
Amphibians and Reptiles		
Tiger Salamander	<i>Ambystoma tigrinum</i>	Generalist
Bull Snake ^{SC}	<i>Pituophis catenifer sayi</i>	Tallgrass prairie and savannah
Smooth Earth Snake	<i>Virginia valeriae</i>	Moist wooded areas and stream valleys
Northern Prairie Skink	<i>Plestiodon septentrionalis</i>	Open grassland with loose/gravelly soils and rocky areas – tends to choose habitat adjacent to wetlands
Smooth Green Snake ^{SC}	<i>Opheodrys vernalis</i>	Moist grassy areas/prairies or grassland surrounding lakes/impoundments
Smallmouth Salamander	<i>Ambystoma texanum</i>	Woodland pools and open woods
Butterflies		
Zabulon Skipper	<i>Poanes zabulon</i>	Riparian zones, oldfield, woodland edge
Reakirts Blue	<i>Echinargus isola</i>	Native prairie
Byssus Skipper ^T	<i>Problema byssus</i>	Tallgrass prairie

Common Name	Scientific Name	Habitat Preference
Odonates		
Slaty Skimmer	<i>Libellula incesta</i>	Backwater
Sulphur-tipped Clubtail	<i>Gomphus militaris</i>	Lake/pond
Spangled Skimmer	<i>Libellula cyanea</i>	Lake/pond
Vesper Bluet	<i>Enallagma vesperum</i>	Lake/pond
Mammals		
Northern Long eared bat	<i>Myotis septentrionalis</i>	Forest
Indiana Bat ^E	<i>Myotis sodalis</i>	Forest
Southern Flying Squirrel	<i>Glaucomys volans</i>	
Woodland Vole	<i>Microtus pinetorum</i>	Forest
Gray Fox	<i>Urocyon cinereoargenteus</i>	Forest/woodland
Franklin's Ground Squirrel	<i>Spermophilus franklinii</i>	Tallgrass prairie, savanna, roadsides
Prairie Vole	<i>Microtus pinetorum</i>	Upland prairie
Woodland-Shrub nesting birds		
Barn Owl	<i>Tyto alba</i>	
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	
Bell's Vireo	<i>Vireo bellii</i>	
Brown Thrasher	<i>Toxostoma rufum</i>	
Common Yellowthroat	<i>Geothlypis formosus</i>	
Forest Nesting Birds		
Red-shouldered hawk ^E	<i>Buteo lineatus</i>	
American Woodcock	<i>Scolopax minor</i>	
Broad-winged hawk	<i>Buteo platypterus</i>	
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	
Chimney Swift	<i>Chaetura pelagica</i>	
Acadian Flycatcher	<i>Empidonax virescens</i>	
Wood Thrush	<i>Hylocichla mustelina</i>	
Louisiana Waterthrush	<i>Parkesia motacilla</i>	
Kentucky Warbler	<i>Geothlypis formosus</i>	
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	
Eastern Screech Owl	<i>Otus asio</i>	
Northern Flicker	<i>Colaptes auratus</i>	
Eastern Wood-Pewee	<i>Contopus virens</i>	
Eastern Kingbird	<i>Tyrannus tyrannus</i>	

State-listed species (Code of Iowa, Chapter 481B): Special Concern (SC), Threatened (T), and Endangered (E)

THREATENED AND ENDANGERED SPECIES

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. 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 and Management Plans; Management Plans for Wildlife Management Areas in the State along with recommendations from NAI staff for specific projects. Management activities are not initiated until this review has been

completed and T/E comments/concerns have been addressed. The information included here represents the status of listed species at the time this plan was written. Managers understand that these lists continue to change and that updated references must be consulted before undertaking management actions recommended by the plan, in order to avoid and minimize impacts on listed species.

Rusty Patched Bumblebee

The rusty-patched bumblebee (RPBB; *Bombus affinis*) is a ground nesting Federally-Endangered bee, primarily found in open meadows and woodlands of the northeastern two-thirds of Iowa. Portions of McCoy WMA is within the high potential zone for RPBB. High quality forests within the HPZ may provide overwintering habitat for RPBB queens and early woodland wildflowers and flowering shrubs provide an important source of food for queens that emerge in early spring. Even though management is intended to improve habitat quality and forest health, activities may impact overwintering queens depending on timing. Projects that will result in disturbance to the forest floor during the queen overwintering period, mid-October through mid-March (south of HWY 30) OR mid-October through mid-April (north of HWY 30) will be reviewed as described above to assess the potential for impacts and identify appropriate conservation measures to avoid and minimize RPBB impacts.

Guidelines for Protecting Northern Long-Eared, Indiana, and Tricolored Bats

The Indiana Bat (*Myotis sodalis*) is a federal (50 CFR Part 17) and state (Code of Iowa, Chapter 481B) endangered species that occurs in southern Iowa as far north as Highway 30. The Northern Long-Eared Bat (*Myotis septentrionalis*) is a federally endangered species that can occur in any county of Iowa. The Tricolored Bat (*Perimyotis subflavus*) is a federally proposed endangered species that can occur in any county in Iowa. All three bats can be active from April through September in forested areas. Female Indiana bat and Northern Long-Eared Bats may roost and rear young in standing trees 3" DBH and larger, either dead or alive, with loose, shaggy, or peeling slabs of bark, cavities in the trunk or large limbs, or large cracks or openings. Tricolored bats roost in similar forested habitat but roost within leaf clusters instead of under loose bark.

To protect summer habitat for all three species of bats, adhere to the following guidance:

- Avoid felling any dead standing or live trees 3" DBH and larger that contain cavities, cracks or crevices, or loose, platy, peeling, or shaggy bark from April 1 through September 30.
- Such trees meeting the above criteria may be felled beginning October 1 through March 31; however, in all forest management projects, retain a minimum of 9 suitable habitat trees per acre if present above this rate.
- Live trees may be girdled any time of year to create habitat snags in Forest Stand Improvement operations.
- Avoid conducting prescribed burns in woodlands from April 1 until September 30.
- If prescribed burning operations must take place after April 1 through September 30, then protect trees 9" DBH and larger that contain cavities, cracks or crevices, or loose, platy, peeling, or shaggy bark.
- Avoid clearcuts, seed tree harvests, or site preparation projects larger than 10 acres that could negatively affect suitable habitat.

If the above guidance cannot be adhered to, an individual consultation with the U.S. FWS Rock Island Field Office is needed to determine how to best avoid adverse effects to Indiana Bat, Northern Long-Eared Bat, and/or Tricolored Bat.