Forest Wildlife Stewardship Plan
Black Hawk Wildlife Management Area
Sac County

Developed by
Aaron Wright, Forester, Iowa DNR
Clint Maddix, Wildlife Biologist, Iowa DNR
Prepared: 8/21/2025

Table of Contents

INTRODUCTION

Contact information:
Clint Maddix, Wildlife Biologist
Black Hawk Wildlife Management Unit
116 S State Rd
Lake View, IA, 51450
Office phone: 712-657-2639

The Black Hawk Wildlife Management Area (WMA) is located in Sections 33, 34 and 35 of Wall Lake Township and in Sections 2, 3, 4, 9, 15 and 16 of Viola Township in Sac County, Iowa.

Black Hawk WMA comprises 2,107 total acres, which includes Black Hawk Lake, with 266 acres of it being forested (13%). Additionally, the WMA contains over 1,300 acres of wetlands/lakes and approximately 400 acres of restored prairie.

Black Hawk Wildlife Management Area is located directly adjacent to the City of Lake View. While Black Hawk Lake is a sovereign water body, the earliest tracts of land that make up this area were purchased in the late 1920s. The bulk of the timbered areas were purchased in the 1930s and 1940s after they were disturbed by the exploration of, and the act of mining sand and gravel. The Hallet, Martin, and NW Gravel Co. Tracts have since naturally reclaimed themselves into a woodland that is made up of various native and non-native trees and shrubs. The areas that sport oak and cherry trees were planted as a tree nursery in the 1930s and 1940s. A portion of the area used to serve as a wildlife refuge until the 1980s when it was opened to public hunting. An earthen hiking trail was established through portions of the area in the early 1980s and later was officially named the Stubb Severson Memorial Trail, after Bernard 'Stubb' Severson, an Iowa Conservation Commission Supervisor and Lake Viewresident who passed away in 1981. The Sauk Rail Trail, a concrete multi-purpose recreational trail that runs through the area, was established by the Sac County Conservation Board around the year 2000. The WMA is home to a wide variety of both game and nongame wildlife species and the diversity of the area provides hunters ample opportunities. The most sought-after game animals include waterfowl, pheasant, deer, squirrels and rabbits. However, the DNR's Multiple Species Inventory and Monitoring Program has documented 179 species of birds, 40 mammals, 63 Odonates, 17 herpetofauna, 37 butterflies, 18 fish, and 2 mussels on the WMA.

Reconnaissance surveys of the Black Hawk WMA resources were conducted during the summer of 2024. The resulting data was analyzed after the reconnaissance was completed. The property was divided into a number of stands with each stand representing a homogeneous unit of land to be managed in a specific way. Stand maps with stand descriptions and management recommendations were developed after discussions with the Biologist. Generally, the DNR manages state-owned forest lands for wildlife habitat, forest habitat diversity, recreation, and aesthetics. Major objectives of forest management for the Black Hawk 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 (BMPs) 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 Black Hawk WMA Forest Wildlife Stewardship Plan (FWSP) will begin with a general forest resource and soil type description of the wildlife 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 timelines for completing the management work, when applicable.

The Black Hawk WMA FWSP 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 Black Hawk WMA Biologist. A record of completed management activities will be kept on file at the area biologist'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 Black Hawk WMA FWSP details forest management recommendations for 178.6 forested acres. The Black Hawk WMA forest management area has been divided into 6 individual stands. All of the stands' natural forest types are considered bottomland hardwood but most of it has been highly disturbed in the past, due to mining activity. There are strip pits present in some of the stands, and they can be seen in aerial photos dating back to 1930. Looking at historical aerial photos, this area started as open ground and slowly became forested through the decades to what it is presently.

Most of the overstory tree cover is composed of common species that are found in bottomland forest types. Species such as cottonwood, boxelder, hackberry, green ash, and black walnut are common. Though they are not native to this part of the state, a handful of sycamore trees were planted that are now larger diameter trees. Sycamores are common bottomland trees further south in Iowa. Despite being not native to this part of Iowa they don't pose a threat to displacing local native species. Along with the native overstory species there are a few native species of shrubs found throughout the stands including highbush cranberry, nannyberry, bladdernut, and gray dogwood.

Since this area was highly disturbed in the past, there are larger populations of undesirable, non-native species throughout much of the forested area. Non-native species present are white poplar, Siberian elm, white mulberry, buckthorn, honeysuckle, Japanese barberry, autumn olive, garlic mustard and reed canary grass. Most of the understories have a component of invasive species with many of them being very thick. See attached photo map for specific forest management stand locations in the Maps Section of this plan.

Ignoring the invasive species, and just looking at the native overstory trees, these stands are mostly fully stocked to overstocked. Basal areas are as high as 130 square feet per acre. Size classes of trees vary throughout the stands, but a good representation of poletimber size up to larger sawtimber sizes are present.

There are two main soil types found in this area. The first one which is the most prominent is called pits, sand, and gravel. This just indicates these are highly disturbed mining areas where soil horizons are mixed up. The second most common soil type is called Calco silty clay loam. These soils are occasionally flooded and are poorly drained. Bottomland species are best suited for these soils.

NATURALL RESOURCE MANAGEMENT CONCERNS

Soil and Water Quality Protection

Continue to protect Black Hawk WMA forest management areas from intensive 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 species of trees such as oaks, hickories, and black walnuts. Grazing also greatly limits the effectiveness of woodland improvement practices such as thinning and weed tree removal.

Best management practices (BMPs) will be implemented when doing woodland management work. Below, are some general BMP 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 managing buffer strips from 50 to 150 feet wide (depending on stream width and topography) next to streams. These stream bank management areas (SMAs) should maintain a minimum of 70% perennial conservation cover.
- 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.

Forest Insect and Disease Problems

Spongy Moth

The spongy moth (*Lymantria dispar*) is a European species of insect introduced near Boston, MA in 1869 as an experiment to help provide silk for the textile industry. This exotic insect has continued to spread west defoliating native forests.

Establishment of spongy moths in Iowa will affect the survival of mature trees. Larvae of this insect will feed on the leaves of over 300 host species during the important summer growing season, a time when a tree's leaves are converting sunlight to energy. Repeated defoliation that occurs several years in a row on the same tree will deplete stored nutrients, leading to the tree's decline. Spongy moths are monitored annually with detection trapping. Male moths are captured in detection traps, and isolated populations are treated to prevent the establishment of additional populations.

Iowa has been setting out spongy moth traps since 1972. The area with the most moth presence is northeast Iowa. A few moths get detected in other parts of the state but no substantial populations have been detected. Northeast Iowa is a part of the 'slow the spread' campaign, which is where measures are being taken to stop significant spread westward and to inhibit reproduction. Using trapping survey data, areas with high populations can be strategically targeted to disrupt mating. This is done with aerial application of the female pheromone.

There are no known spongy moth populations in Black Hawk WMA.

Emerald Ash Borer

Emerald ash borer (EAB; *Agrilus planipennis*) is a small, green, invasive wood boring beetle that attacks and kills ash trees. The adults live on the outside of ash trees feeding on leaves during the summer months. The larvae look similar to white grubs and feed on the living plant tissue (phloem and cambium) underneath the bark of ash trees. Trees are killed by the tunneling activity of larvae under the bark, which disrupts the flow of water and nutrients.

Emerald Ash Borer was first detected in Detroit, Michigan in 2002, and has been found in many other states since then. The first infestation of EAB in Iowa was discovered in the northeast part of the state in 2010. Since then, the invasive insect has slowly made its way west. In 2019 EAB was discovered in Sac County where Black Hawk WMA resides. After it was first detected, it was only a few years before it was obviously widespread throughout Sac county. Almost all ash trees in the WMA, except small seedlings and saplings, show signs of the insect and are dead or dying. Ash species located in the WMA include green ash.

Oak Wilt

Oak wilt is a systemic vascular wilt disease of oak trees caused by the fungus *Ceratocyctis fagacearum*. The main vector that spreads the fungus is the sap sucking Nitidulid beetle. The fungus travels through the xylem vessels, which blocks them, and results in mortality of the tree due to water and nutrient flow being cut off. Once a tree is infected it can infect neighboring oak trees due to transport through grafted root systems. All oak species can get this disease but the red oak section is much more susceptible. The species in the red oak section found in central Iowa are northern red oak, black oak, and pin oak. When a red oak species gets the disease, it will die within the year. Oak species in the white oak section can get the disease but are less susceptible. Common Iowa species in the white oak section include white oak, bur oak, chinquapin oak, and swamp white oak. It can take several years for a white oak infested with oak wilt to die.

Oak wilt has not been detected in Black Hawk WMA. Whenever an oak wilt pocket is found, it can be allowed to run its course or infested trees could be salvage harvested along with living oak trees surrounding the pocket. By removing living oak trees that surround the oak wilt pockets, oak wilt will be stopped from spreading through root grafts.

Bur Oak Blight

Bur oak blight is a fungal disease caused by the pathogen *Tubakia iowensis* that has been observed in Iowa since 2005, but has probably been around for a much longer time. This fungal organism can live in the plant tissue for a period of time without any obvious symptoms. Symptoms include necrosis of leaf tissue. The necrosis happens along the veins of the leaf and causes wedge shape browning along the margins. Dead leaves from bur oak blight tend to stay attached to the branches over winter. The fungus overwinters in the petioles of the leaves and in the springtime will produce black pustules on the petiole. Spores produced from these pustules will infect newly emerging leaves during rainy weather. Leaf symptoms don't become evident until around July.

Bur oak blight was not observed in Black Hawk WMA, but it has been observed throughout Iowa.

Thousand Cankers Disease of Black Walnut

Since the 1990s, black walnuts have been dying in the Western U.S. The deaths are caused by a walnut twig beetle (*Pityophthorus juglandis*) that carries a fungus (*Geosmithia morbida*) which is spread as the beetle tunnels through tree tissues. Beetles can reach high populations and many cankers can develop. Trees die from a combination of many small cankers. The insect disease complex has been named thousand cankers disease (TCD).

Thousand cankers disease hasn't been found in Iowa, but it has been found as close as Colorado and Indiana. Trapping efforts for the walnut twig beetle have been in place for a few years now, including at Ledges State Park. Even if the twig beetle is found it doesn't necessarily mean the tree will get TCD if the fungus isn't carried by the beetle.

Asian Longhorned Beetle

Asian Longhorned Beetle (ALB) is an exotic pest native to China. The larva of this beetle kills trees by tunneling through the tree, which girdles stems and branches, cutting off the flow of nutrients and water. ALB most likely traveled to the United States inside wood packaging materials from China. It has been intercepted at various ports of entry and warehouses throughout the country. In the United States the beetle prefers to attack maple species such as: boxelder, sugar, black, and silver which can be found in Black Hawk WMA. ALB has not been found in Iowa but could easily be transported here unintentionally. There are current infestations in eastern states. It was identified in Chicago but was eradicated.

Invasive Plants

Plants introduced into areas where they do not naturally occur are considered alien, exotic, or non-native. Non-native species have been used to prevent erosion, as ornamental plants, wildlife habitat, living fences, and as forage. Occasionally, an alien organism flourishes, quickly dominating its new surroundings. The terms "invasive" or "nuisance" are used to describe such species. Certain introduced species are very successful in their new habitats because they out-compete native plants. There are a number of invasive plants found in Black Hawk WMA forests. They are honeysuckle, buckthorn, autumn olive, Japanese barberry, multiflora rose, white poplar, white mulberry, black locust, Siberian elm, reed canary grass, and garlic mustard. Invasive species can be found throughout most of the stands in the WMA ranging from light infestation to severe infestation. Some stands have an understory where invasive shrubs are so thick that they prevent natural regeneration of desirable species.

Honeysuckle

There are multiple invasive honeysuckle species that are found in Iowa woodlands. They are native to Eurasia and were originally used for ornamental, wildlife habitat, and erosion control purposes. When it was realized they would easily outcompete native understory species, which reduced quality habitat, it was too late. Honeysuckle bushes will invade woodland edges and openings. They are supposedly mostly shade intolerant but they seem to thrive in woodland understories also. They produce orange to red berries that have little nutritional value to wildlife. Leaves on honeysuckle emerge a couple weeks before most native species and will stay green later in the fall while natives have

gone dormant. This makes it easy to identify infestations and to chemically control them without fear of targeting native species.

Honeysuckle can be found throughout Black Hawk WMA and populations are heavy in some areas. Control methods include mechanical, herbicide, fire, or a combination of these.

Autumn Olive
Autumn olive was introduced in the 1830s to help revegetate disturbed areas. It was also highly promoted by natural resource professionals for wildlife habitat and food. This shrub is widely dispersed by birds after they have eaten the bright red fruit. It is easily identified as it has a dark green leaf with the underside being silvery-white. Autumn olive can take over open grasslands, woodland edges, and disturbed woodland openings. Unlike honeysuckle, it doesn't typically do well in shade so it won't usually be widespread in a forest understory.

Autumn olive is found along trails within the Black Hawk WMA forest and also in some woodland edges and forest openings. Control methods include mechanical, herbicide, fire, or a combination of these.

Japanese Barberry
Japanese barberry is a small to medium sized shrub that was planted as hedges in landscaping. This shrub has spread to natural areas and can be very invasive, especially in woodlands because it is shade tolerant. Like other invasive, non-native shrubs it will leaf out early in the spring, shading out any nearby native plants. The twigs are ridged with spines and they produce small, red, oval shaped berries. Along with spreading through seed dispersal, barberry bushes can spread by rhizomes through the root system.

This shrub can be found in stand one and in other isolated areas throughout the WMA. Control methods include herbicides, burning, and mowing.

Multiflora Rose
Multiflora rose is native to parts of Asia, and was introduced to the United States in the mid- 1800s as an ornamental plant because of its showy flowers. It was planted for erosion control, living snow fences, highway median barriers, and living livestock fences. It grows very quickly and forms dense thickets crowding out native plants. It can reproduce from seed as well as rooting from a stem that contacts the soil making a new plant. The stems contain many curved thorns which makes it a big nuisance.

Multiflora rose is not widespread in Black Hawk WMA.

Black Locust
Black locust trees are the only species considered to be invasive in Iowa's forests that is native to the United States. Its native range is in the Appalachian Mountains up into southern Illinois. This tree can grow anywhere from 40-100 feet tall. It has pinnately compound leaves with 7-21 small leaflets per leaf. A pair of spines are usually found at the base of most leaves. This species was planted widely for erosion control in the early 1900s and was also grown for fence posts due to its rot resistance. The fruit is a thin and narrow seed pod, 2-4 inches long. Besides propagating from seed, this tree spreads from rhizomes in its root system. This is typically how this tree becomes invasive in natural areas.

Black locust can be found periodically throughout Black Hawk WMA. Control methods include a combination of mechanical and herbicide treatment. Chemical treatment is necessary because this species readily spreads by stump and root sprouting when cut and left untreated.

White Mulberry
White mulberry is a medium size tree that can grow 30-50 feet at maturity. It looks similar to the native red mulberry, but is more abundant. It is commonly found in disturbed areas such as old pasture and fence rows. It produces a fruit that looks very similar to a black berry. White mulberry is native to Asia and was introduced to the United States because of the silk industry. Mulberry leaves are a favorite food of the silkworm.

White mulberry can be found throughout Black Hawk WMA. Control measures include a combination of mechanical and herbicide methods.

Garlic Mustard
Garlic mustard is a biennial forb that was introduced from Europe in the 1800s. This plant is highly invasive and spreads quickly forming thick stands in the forest understory. The thick stands out compete native understory plants and tree seedlings to the point of completely suppressing their growth. Garlic mustard also has allelochemicals that are released into the soil which prevent seeds from other plants from germinating. It has two different growing phases. The first year it grows close to the ground and resembles creeping Charlie. It produces a stalk the second year, produces flowers at the top of the stalk, and will produce fruits which contain many little black seeds.

Garlic mustard can be found in various areas throughout Black Hawk WMA. Control measures include fire, herbicide, and mechanical means.

Buckthorn
Common and Glossy buckthorn are native to Eurasia and were brought to the Midwest to be used for hedges and landscaping. They have a longer growing season than most native plants and can out compete them. They produce many dark berries that drop to the ground and germinate or are spread by birds who feed on them. Buckthorn grows well in open woodlands and woodland edges. They can form thickets of sapling size stems and can also blanket the forest floor with small seedlings. Individual shrubs can grow ten plus feet tall and can grow pole timber size stems. Stems are often confused with black cherry or wild plum.

Buckthorn is widespread throughout the Black Hawk WMA. Control methods include a combination of mechanical and herbicide treatment.

White Poplar
White poplar is an invasive tree that can grow 40-80 feet tall. It is native to Eurasia and was introduced to the United States as an ornamental tree. The leaves grow 2-5 inches long and resemble the shape of a maple leaf. The top side of the leaf is a dark green and the underside is white and fuzzy. They produce flowers in slim, cylindrical clusters called catkins before the leaves develop. The fruit are small, hairy seed pods that are spread by the wind. Where one or two white poplars are growing, they will typically spread through root suckers and create a dense stand of trees.

White poplar is found in clusters in a few areas in Black Hawk WMA. Control methods include a combination of mechanical and herbicide treatment.

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, picnic table, parked car, campsite, bench, 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 dwellings, equipment, and people.

Wildlife Concerns
Forest management activities such as timber harvesting, thinning, burning, and tree planting can have beneficial effects to wildlife populations. The 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 405 *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 threatenedand 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. This provides 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 Black Hawk WMA may be suitable habitat for summering populations of the Indiana Bat, Northern Long Eared (NLEB), and Tricolored Bat.

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 bats 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 1st through September 30th.
  - 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 Threatened and Endangered Wildlife Webpage.

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 with historical and cultural value 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 Black Hawk WMA 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 Black Hawk 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 and animal species.

FOREST MANAGEMENT OBJECTIVES

The main goal is to make strategic, forest health-based decisions in the resource management of Black Hawk WMA. To achieve this goal, there are several objectives to help guide and prioritize the work to be completed.

1. Control invasive plant species throughout the WMA which are overwhelming in the understory in most areas.
2. Create conditions necessary for walnut recruitment throughout the maturing bottomland timber stands.
3. Maintain productive timber stands and improve declining or damaged timber stands through forest stand improvement and timber harvesting practices.
4. Preserve and enhance habitat for unusual, threatened, rare and endangered plants and wildlife.

CURRENT DISTRIBUTION OF TREE SIZE AT BLACK HAWK WMA

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

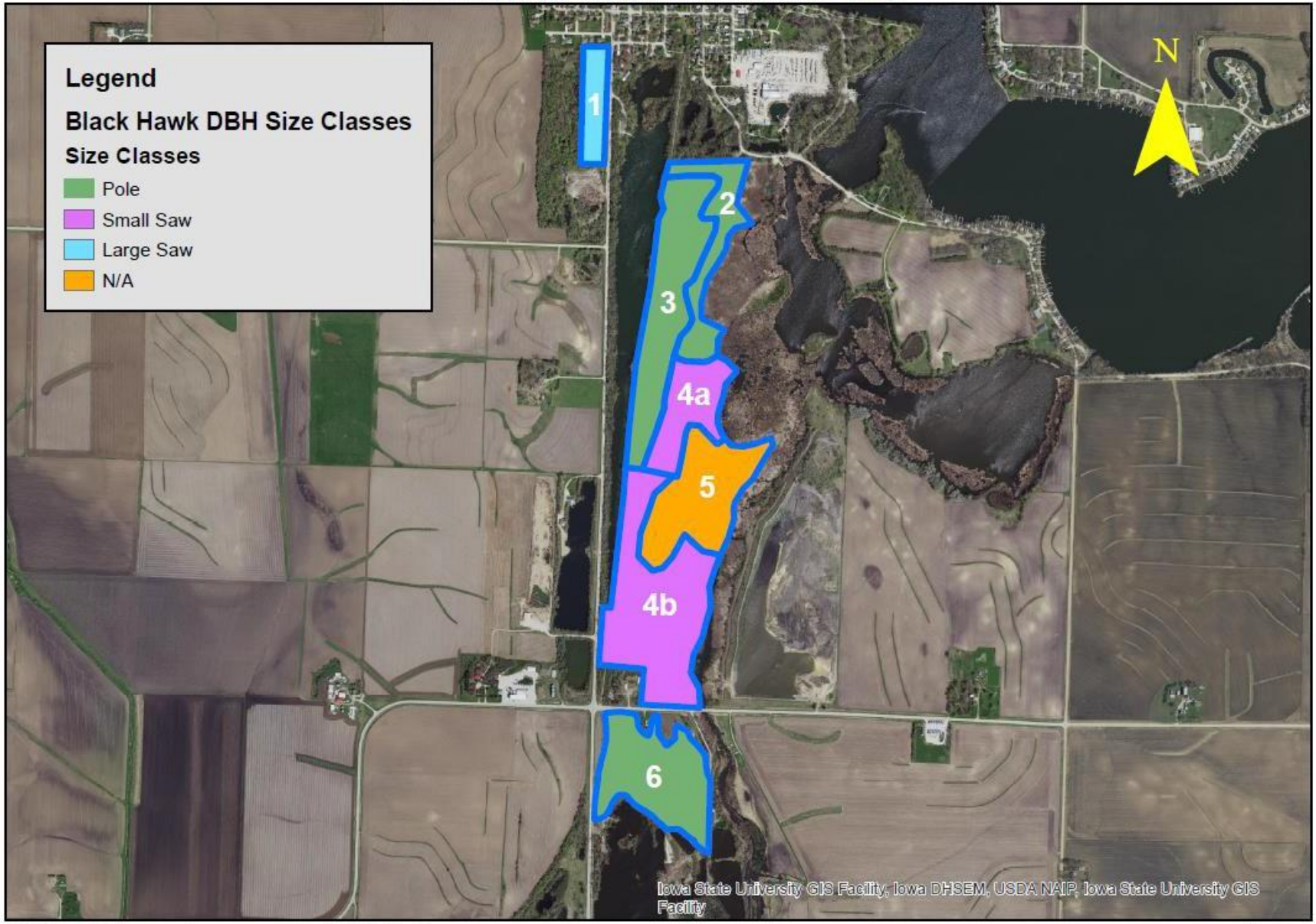
Tree Size Class	Acres	% of Total Area
Poletimber	78.9	44.2
Small Sawtimber	62.5	35
Sawtimber	8.6	4.8
Other	28.6	16
Total	**178.6**	**100**

PROPOSED MANAGEMENT SYSTEMS FOR BLACK HAWK WMA

Recommendations for each stand were based on whether the area will be managed to create early successional growth, an even age system, uneven age system, or as a 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	62.4	35
Even Age	87.6	49
Viewshed	28.6	16
Total	**178.6**	**100**

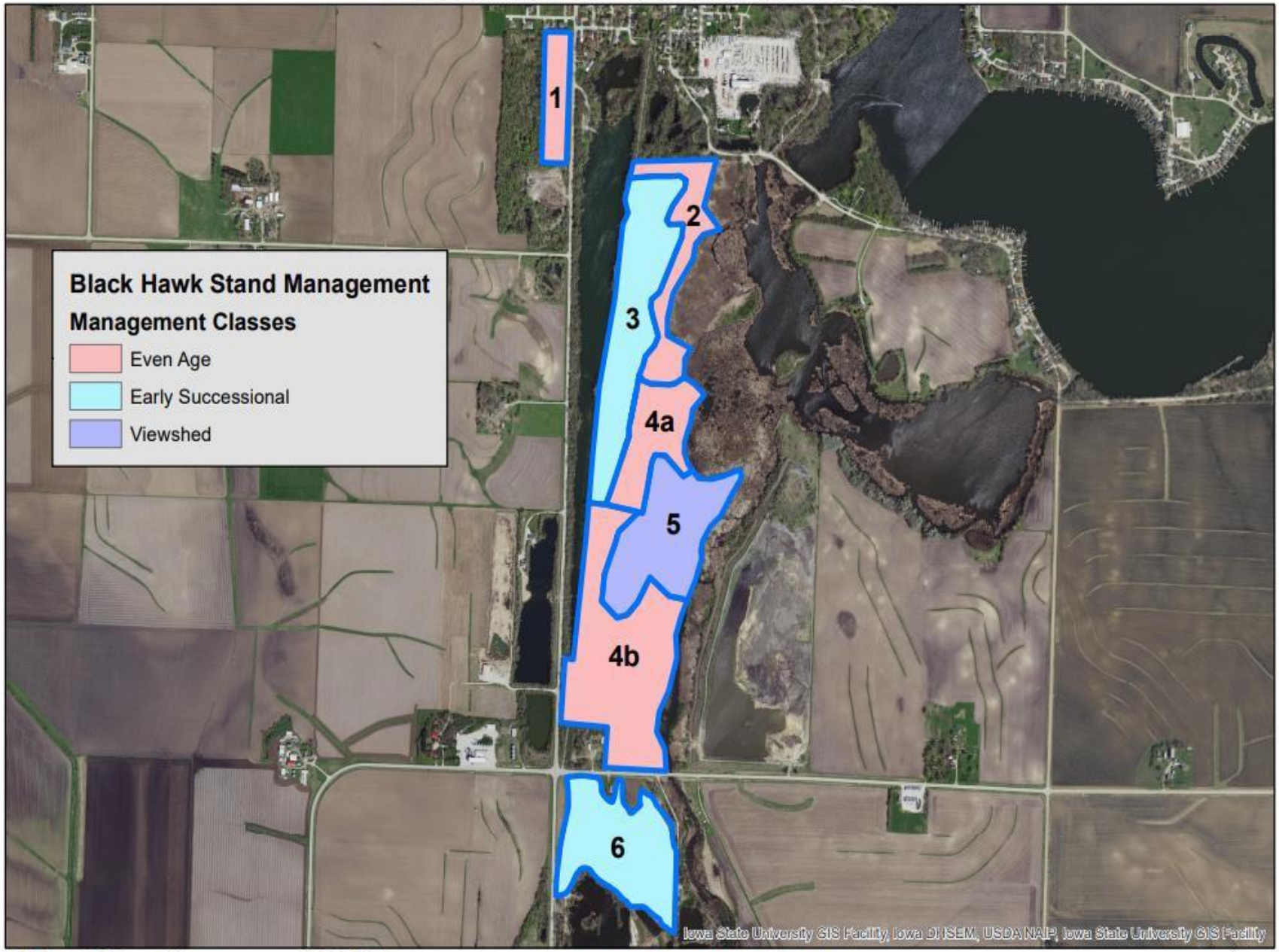
Black Hawk WMA Size Classes Map



Section 2, 3, 4, 9, 15, and 16/Viola Twp.

Section 33, 34, and 35/Wall Lake Twp.

Black Hawk WMA Stand Management



MANAGEMENT SYSTEMS

Natural resource management systems are a way of establishing big picture, long-term management goals and objectives for stands so that appropriate management activities can be determined. What follows is a description of the management systems that may be used within the WMA.

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, wood ducks and black-capped chickadees. 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 to establish oaks.

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. Before the final clearcut, a shelterwood stand has an open canopy and a regenerating understory, which supports a high diversity of wildlife species associated with both early successional and mature forest structures. This structure is ideal for species like pollinators that need flowering shrubs and herbaceous plants, and bats that forage in the open understory. These systems typically support a larger richness of bird species than either an early successional stand or a mature closed-canopy system. 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. Leaving some release trees girdled but standing increases wildlife habitat for cavity nesting and denning species as well as those that forage on or roost under dead bark.

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 desired in the future. Leaving a few of these trees felled on the forest floor provides cover for reptiles and amphibians, insects, and small mammals.

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 to 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, amphibians, and small mammals.

Oak Savanna and Woodland Management

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 this region and 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, barn owl, 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.

Regenerating sparse oaks that will eventually replace the current mature canopy component is key.

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. These areas are also important foraging sites for pollinators and bats and as post- fledging and migratory habitats for birds that nest in mature forests. 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 maintain 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 desired, especially when invasive plant management is needed, but the major objective is to have minimal disturbance.

Black Hawk WMA Stand Map

Section 2, 3, 4, 9, 15, and 16/Viola Twp.
Section 33, 34, and 35/Wall Lake Twp.
Sac County

Black Hawk WMA 1930's Map

1,600 800 0 1,600 Feet

Section 2, 3, 4, 9, 15, and 16/Viola Twp.
Section 33, 34, and 35/Wall Lake Twp.
Sac County

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 stands properly stocked with desirable tree species, and protected from external damaging influences is key to the sustainability of Iowa's forest resources.

Stand 1: 8.6 acres

Forest Description

This parcel of forest is located on the south edge of Lakeview on the west side of Perkins Avenue. Across the road from the parcel is a boat landing managed by Black Hawk State Park. There are many consecutive man-made ridges about 20 feet high that are the remnants of mining practices. Photos from the 1930s indicate mining occurred before the photos were taken. The overstory in this stand is made up of very large cottonwood trees with 30 and 40 plus inch diameters. Large green ash trees also are a big component of the overstory. At the time of the inventory the ash trees were not showing signs of significant decline, but there were signs of emerald ash borer. Other overstory species include American elm, silver maple, hackberry, white mulberry, and a few pole size black walnuts. The average basal area is around 100 square feet per acre, but that average will drop when the ash trees die. The midstory has a few different tree species in the sapling size class including hackberry, mulberry, buckeye, ash, and pockets of silver maple. Invasive shrub species in this stand include honeysuckle, buckthorn, and Japanese barberry. The populations of these invasive shrubs are moderate to heavy. They range in size from ground level to head high. Garlic mustard and Siberian elm trees are a couple other invasive species in this stand. Garlic mustard can be found throughout the stand and Siberian elm trees can be found at the south end of the stand. The adjacent property, south and west of this stand is owned by the city of Lakeview and these properties have large populations of Siberian elm.

Stand Recommendations - Even age

Target the invasive honeysuckle, buckthorn, Japanese barberry, and white mulberry for eradication by use of the cut stump method and foliar spray. An overstory thinning isn't a high priority except for releasing the nice walnut pole size trees found sporadically. Planting tree seedlings will help move the needle toward a more desirable stand in the future. Seedlings should be planted in openings and in areas where openings will appear due to dying ash trees. Dead ash trees may be left standing for wildlife habitat if so desired.

Stand 2: 16.5 acres

Forest Description

The overstory of this stand contains a lot of very large cottonwood trees. Other species in the overstory include green ash, hackberry, mulberry, black locust, buckeye, and black walnut. The average basal area is around 130 square feet per acre. The black walnut trees are mostly in the poletimber size class and will benefit from crop tree release. The understory and forest edges have areas of desirable native shrub species including chokecherry and highbush cranberry. Along with the desirable shrubs are undesirable invasive shrub species including buckthorn and honeysuckle, which is heavy in many areas.

Stand Recommendations - Even age

Eradicate buckthorn and honeysuckle using the cut stump method. Following the invasive control, perform a crop tree release to favor the quality walnut trees. Kill any invasive tree at the same time such as black locust, Siberian elm, and white mulberry.

Stand 3: 34.1 acres

Forest Description

This stand has been highly disturbed from mining practices in the past. The very north part of the stand contains a lot of honeysuckle, buckthorn, and pole size cedars. It's growing so thick it is difficult to navigate through. The rest of the stand to the south is a mixture of many ponds of water as a result of past mining activities. In between the ponds there are lines of trees and invasive shrubs. Throughout the whole stand there are hardwood species including some pole size black walnut, black locust, cottonwood, green ash, and a variety of other species.

Stand Recommendations - Even age and Early Successional

Invasive species control should be the first priority in this stand, especially on the north end where it is very thick.

Forestry mowing and spraying may be an option for the northern part. Target all invasive shrubs and most of the cedars. A tree and shrub planting could follow the brush clearing. Shrubs such as dogwoods, wild plums, and viburnums along with trees such as aspen could be planted with tight spacing. Allow trees and shrubs to grow 15-20 years then reset them by cutting them down and allowing them to grow back.

Stand 4a & 4b: 62.5 acres

Forest Description

Stand 4a is 16.5 acres. The overstory of this stand consists mostly of decent poletimber size black walnut trees. Also, in the overstory are scattered mature cottonwood and green ash trees. In the eastern part of the stand is a small pocket of invasive white poplar trees. The understory is thick with invasive shrubs. Through most of the stand buckthorn and honeysuckle are present and in the open areas and along trails there is autumn olive. There is also a wide variety of desirable native shrubs in the understory including gray dogwood, choke cherry, nannyberry, and highbush cranberry.

Stand 4b is 46 acres. The overstory of this stand is dominated by black walnut just like in stand 4a but the average diameter is larger. It also has more black cherry trees, larger pockets of mature cottonwood trees, and also includes a pocket of large sycamore trees. The understory is very similar to 4a. This stand could benefit from an overstory thinning and could include harvesting marketable trees.

Stand Recommendations - Even age

Kill the invasive species in this stand. The terrain in this stand is mostly flat so a forestry mower can be used in areas that are especially thick with invasive shrubs. Spraying the stumps after mowing or spraying the stump sprouts later on will be necessary. Following invasive species control, an overstory thinning could be conducted to benefit the growth of nice walnut trees.

Enough marketable trees might be marked for removal to justify having a sale as part of the thinning process. The basal area following the thinning should not fall below an average of 70 square feet per acre.

Stand 5: 28.6 acres

Forest Description

This stand is a conglomeration of a few different areas which includes an open area, an areathat was strip mined, and an inaccessible forested area. What they have in common is that they are low priority for management. There are a variety of hardwood trees including cottonwood, black walnut, and green ash. Invasive shrubs are prevalent. Though this stand is a lower priority, invasive shrub control should be done as time allows.

Stand Recommendations - Viewshed

Invasive species control can be conducted at the same time as stand four is being done. No other management is necessary for this stand.

Stand 6: 28.3 acres

Forest Description

This stand is located on the south side of 350th street. Along with most of the other stands on this property, this area was highly disturbed from past mining activities. The overstory has scattered individual mature cottonwood trees and groups of mature cottonwood trees throughout. The rest of the trees in the overstory are a variety of species including white mulberry, hackberry, black cherry, black walnut, boxelder, and a few white poplars. The average basal area is around 130 square feet per acre. The understory/midstory of this stand is thick with gray dogwood, honeysuckle, white mulberry, hackberry, and chokecherry. Along with the invasive species of honeysuckle and white mulberry, there are other invasive species on the ground such as white poplar seedlings and garlic mustard.

Stand Recommendations - Even age and Early Successional

Invasive species control is the first priority in this stand. This stand is also flat so a forestry mower can be utilized. Following the first stage of invasive control, identify areas that can be managed as early successional habitat. Multiple areas throughout the stand should be identified and should be put on a rotation of clearing vegetation. Trees and brush should be cleared every 15 years for each identified site. Areas that are not identified for early successional habitat

should have a crop tree release conducted for nicer walnut trees and/or have a variety of planted hardwood species.

SUMMARY OF STANDS

Stand	Stand Acres	Forest Type	Size Class	Management System	Management Recommendations	Priority
1	8.6	Mixed hardwoods	sawtimber	even age	invasive species control, tree planting	M
2	16.5	bottomland hardwoods	poletimber	even age	invasive species control, overstory thinning	H
3	34.1	Mixed hardwoods	poletimber	Early successional	invasive species control, tree planting	M
4a	16.5	black walnut/ bottomland hardwoods	small sawtimber	even age	invasive species control, overstory thinning	H
4b	46	black walnut/ bottomland hardwoods	small sawtimber	even age	invasive species control, overstory thinning, harvest	H
5	28.6	mixed hardwoods	N/A	viewshed	invasive species control	L
6	28.3	mixed hardwoods	poletimber	even age/ early successional	invasive species control, CTR, tree planting	M

SPECIES OF GREATEST CONSERVATION NEED

The Iowa DNR's Iowa Wildlife Action Plan (IWAP) identifies certain wildlife species as species of "greatest conservation need". Management activities must always take into consideration these Species of Greatest Conservation Need, and also to "keep common species common." The following list is known T & E Species, as well as SGCN found on the site as documented by MSIM.

Common Name	Scientific Name	State Listed Species
Amphibians and Reptiles		
Blanchard's Cricket Frog	*Acris crepitans*	Iowa SGCN
Blanding's Turtle	*Emydoidea blandingi*	State Threatened
Copes Gray Treefrog	*Hyla chrysoscelis*	Iowa SGCN
Eastern Gray Treefrog	*Hyla versicolor*	Iowa SGCN
Northern Leopard Frog	*Lithobates pipiens*	Iowa SGCN
Prairie Skink	*Plestiodon septentrionalis*	Iowa SGCN
Northern Redbelly Snake	*Storeria occipitomaculata*	Iowa SGCN
Northern Water Snake	*Nerodia sipedon*	Iowa SGCN
Plains Garter Snake	*Thamnophis radix*	Iowa SGCN
Prairie Ringneck Snake	*Diadophis punctatus*	Iowa SGCN
Snapping Turtle	*Chelydra serpentina*	Iowa SGCN
Spiny Softshell Turtle	*Apalone spinifera*	Iowa SGCN
Western Fox Snake	*Pantherophis ramspotti*	Iowa SGCN
Butterflies		
Dion Skipper	*Euphyes dion*	State Special Concern
Eyed Brown	*Satyrodes eurydice*	Iowa SGCN
Monarch	*Danaus plexippus*	Iowa SGCN
Regal Fritillary	*Speyeria idalia*	State Special Concern
Odonates		
Plains Emerald	*Somatochlora ensigera*	Iowa SGCN
Sedge Sprite	*Nehalennia irene*	Iowa SGCN
Variable Darner	*Aeshna interrupta lineata*	Iowa SGCN

Common Name	Scientific Name	State Listed Species
Mammals		
Evening Bat	*Nycticeius humeralus*	Iowa SGCN
Gray Fox	*Urocyon cinereoargenteus*	Iowa SGCN
Least Shrew	*Cryptotis parva*	State Threatened
Northern Long-eared Bat	*Myotis septentrionalis*	Federal Endangered
Plains Pocket Gopher	*Geomys bursarius*	Iowa SGCN
Silver-haired Bat	*Lasionycteris noctivagans*	Iowa SGCN
Tri-colored Bat	*Perimyotis subflavus*	Proposed Federal Endangered
Birds		
Bald Eagle	*Haliaeetus leucocephalus*	State Special Concern
Baltimore Oriole	*Icterus galbula*	Iowa SGCN
Bank Swallow	*Riparia riparia*	Iowa SGCN
Bay-breasted Warbler	*Dendroica castanea*	Iowa SGCN
Bell's Vireo	*Vireo bellii*	Iowa SGCN
Belted Kingfisher	*Ceryle alcyon*	Iowa SGCN
Black-billed Cuckoo	*Coccyzus erythropthalmus*	Iowa SGCN
Broad-winged Hawk	*Buteo platypterus*	Iowa SGCN
Brown Thrasher	*Toxostoma rufum*	Iowa SGCN
Canada Warbler	*Wilsonia canadensis*	Iowa SGCN
Chimney Swift	*Chaetura pelagica*	Iowa SGCN
Common Nighthawk	*Chordeiles minor*	Iowa SGCN
Common Yellowthroat	*Geothlypis trichas*	Iowa SGCN
Dickcissel	*Spiza americana*	Iowa SGCN
Eastern Kingbird	*Tyrannus tyrannus*	Iowa SGCN
Eastern Meadowlark	*Sturnella magna*	Iowa SGCN
Eastern Wood-pewee	*Contopus virens*	Iowa SGCN
Field Sparrow	*Spizella pusilla*	Iowa SGCN
Golden-winged Warbler	*Vermivora chrysoptera*	Iowa SGCN
Grasshopper Sparrow	*Ammodramus savannarum*	Iowa SGCN
Harris's Sparrow	*Zonotrichia querula*	Iowa SGCN
Northern Bobwhite	*Colinus virginianus*	Iowa SGCN
Northern Flicker	*Colaptes auratus*	Iowa SGCN
Northern Harrier	*Circus cyaneus*	State Endangered
Peregrine Falcon	*Falco peregrinus*	State Special Concern
Prothonotary Warbler	*Protonotaria citrea*	Iowa SGCN
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Iowa SGCN
Red-shouldered Hawk	*Buteo lineatus*	State Endangered
Sedge Wren	*Cistothorus platensis*	Iowa SGCN
Swainson's Hawk	*Buteo swainsoni*	Iowa SGCN
Veery	*Catharus fuscescens*	Iowa SGCN
Wood Thrush	*Hylocichla mustelina*	Iowa SGCN
Yellow-billed Cuckoo	*Coccyzus americanus*	Iowa SGCN