Forest Resource and Stewardship Plan for:

Cedar River Natural Resource Area

September 2020

Forest Stand Mapping Provided By:

Bill Haywood, Private Forester Consultant
Forest Improvement Services
2722 Badge Ave.
Janesville, Ia 50647

Plan Prepared By:

Jim Weimer & Kyle Bauch
Wildlife Conservationist
Black Hawk County Conservation
1346 W. Airline Highway
Waterloo, Ia 50703
jweimer@co.black-hawk.ia.us

Introduction

The purpose of this document is to serve as a "Master Plan" for forest management activities at the Cedar River Natural Resource Area in Black Hawk County. Active woodland management can improve the quality & diversity of forest habitat for wildlife while optimizing other forest benefits such as recreation, environmental health, and forest products.

In developing this plan, the overall goals for forest resources were established by conservation board staff. Bill Haywood, a private forester consultant with Forest Improvement Services performed field surveys and timber stand mapping to develop an inventory of the current species composition and habitat structure of the forested portions of the area. This information was compiled and management recommendations written which could be used to achieve the desired goals & objectives.

General Description of the Property

The Cedar River Natural Resource Area (CRNRA) is located 5 miles south Waterloo in the Cedar Township. The area consists of approximately 593 acres of land sandwiched between the Cedar River to the east and the Cedar Valley Nature Trail to the west. The site consists of 70+ acres of prairie along with wetlands and floodplain forests. Miller Creek meanders its way through the area before empting into the Cedar River. The majority of the timber resources are located south of the park road and Miller Creek. Hunting, shooting, hiking, fishing, and wildlife viewing are some of outdoor recreation activities the site provides.

The terrain and soils at CRNRA are reflective of the Cedar River's and Wolf Creek's flowage- a complex arrangement of alluvial soils ranging from fine sands & loams that occasionally to frequently flood. (Appendix A). Over half of the properties soil type is considered Spillville, Colland, and Channeled that slowly drain. This diversity of soils lend to a highly diverse species mix of plant communities. As implementation of various management efforts occurs, it will be important to appropriately match the targeted plant/species community with the local soil type --- this will primarily be done based on the species that are currently growing in an area.

According to the state's historical vegetation map and atlas from the mid-late 1800's, at least half of what is now the CRNRA was covered in grassland and native prairie with the forest resources isolated specifically to the south of Miller Creek Rd. and Miller Creek (Appendix B). Photos from the 1930's – 1960's shows this forest to have a fairly open canopy, probably due to past cutting and grazing by livestock which was typical of Iowa's forests during this time period. It is also a possibility that some of the forest was more savanna like, with mature tree species of bur oak and swamp white oak present. Currently, the once open canopy has slowly filled in with pole size trees, shading out most of the understory vegetation (Appendix C).

Additional information about the Cedar River Natural Resource Area can be found at www.mycountyparks.com.

Forest Resource Goals For CRNRA

There are a variety of recreational activities and pursuits that occur at the CRNRA including hunting, bird watching, hiking, shooting, and fishing. Developed facilities and trails are minimal, offering a relatively primitive experience.

The following goals were identified for the Cedar River Natural Resource Area as they pertain to the forest resource and wildlife habitat:

- Manage the forest to enhance and optimize the wildlife habitat for a variety of both game and non-game species
- Enhance biodiversity of plant communities through thinning, crop tree release, harvesting, and invasive species control
- Establish and maintain various forest successions to benefit wildlife and diversify the forest community
- Enhance and maintain a high quality riparian forest along Miller Creek and the Cedar River
- Sustainably utilize commercial timber products as a way to offset management costs while accomplishing these habitat & ecological goals
- Retain hardwoods such as oak, walnut, hard maple as a long term component of the forest, where possible, for its wildlife and aesthetic values
- Maintain the current acres in prairie to provide for wildlife diversity , water quality, and recreational opportunities

Managing Forest Succession for Wildlife

The basic tool or means of enhancing wildlife habitat and biodiversity in the forest is to manipulate the successional stages through vegetative management. Successional stages are the different phases a forest goes through in time as it grows from infancy to mature old-growth, as shown in the diagram below. As a forest naturally progresses through these stages, the plant communities and wildlife inhabitants will also changes.

The **seedlings & saplings** stage, also known as early successional cover, contains a mixture of grasses, weeds, small shrubs, thorny brambles, and young trees. It is best described as brushy habitat. Many types of small game such as rabbits, mice, voles, & snakes use this cover. Not surprisingly, it's also preferred hunting ground for avian predators including hawks and owls. Pheasants, quail, and woodcock will use this cover at certain times of the year when heavier cover is desired. Deer will use it for bedding, fawning, browsing, rubbing, and staging. Female wild turkeys use it for nesting. Songbirds that prefer this cover include gold-winged warbler, blue-winged warbler, black-billed cuckoo, yellow-winged cuckoo, eastern towhee, and prairie warbler.

During the **poletimber** stage, the forest canopy closes in and very little sunlight reaches the ground. The grasses, weeds, and other ground plants are shaded out by the dense layer of trees up above, which are all about the same age and fairly uniform in height and form. Consequently, this stage of the forest offers the least amount of diversity for wildlife and it's usually desirable to manually thin some of the trees out to enhance tree growth and speed up the transition to the next stage, which is the **small sawtimber** stage. Thinning will also increase acorn & fruit production of favored trees, and make the trees stronger, healthier, and more immune to disease & insect attacks, and get sunlight to the ground to stimulate vegetation and new cover for wildlife. As the forest goes deeper into the small sawtimber stage, the habitat becomes more complex with different layers and new shrubs & saplings emerging.

When the forest reaches the **mature sawtimber** stage, some trees have begun to die from natural causes like lightning strikes, wind, snow & ice, competition, or old age. Selective tree harvesting

can also have this effect. Trees that have died but are still standing are called snags and are very important to cavity-nesting critters and woodpeckers. Fallen logs & tree tops house or hide animals on the ground such as whitetail deer, and then rot back into the soil. Wild turkeys roost in the tops of mature trees and eat the sweet acorns of oak trees. Mosses and wildflowers become more abundant and insects find refuge in small microhabitats. Many birds prefer this more diverse habitat structure with its complex layers, such as the acadian flycatcher, cerulean warbler, veery, and the black & white warblers among others. Near large rivers, bald eagles and various species of herons may make their nests in mature trees. Various reptiles and amphibians also like mature bottomland forests and the mixture of seasonal ponds, emergent logs for sunning, and hiding places.

As this process of succession evolves, certain trees that require full sunlight such as oak & walnut are gradually replaced by tree species that can tolerate shade (such as basswood & hackberry, among others). Vegetative management practices such as tree cutting, burning, or planting are needed to restore certain species like oak and walnut and to reset the process back to the beginning.

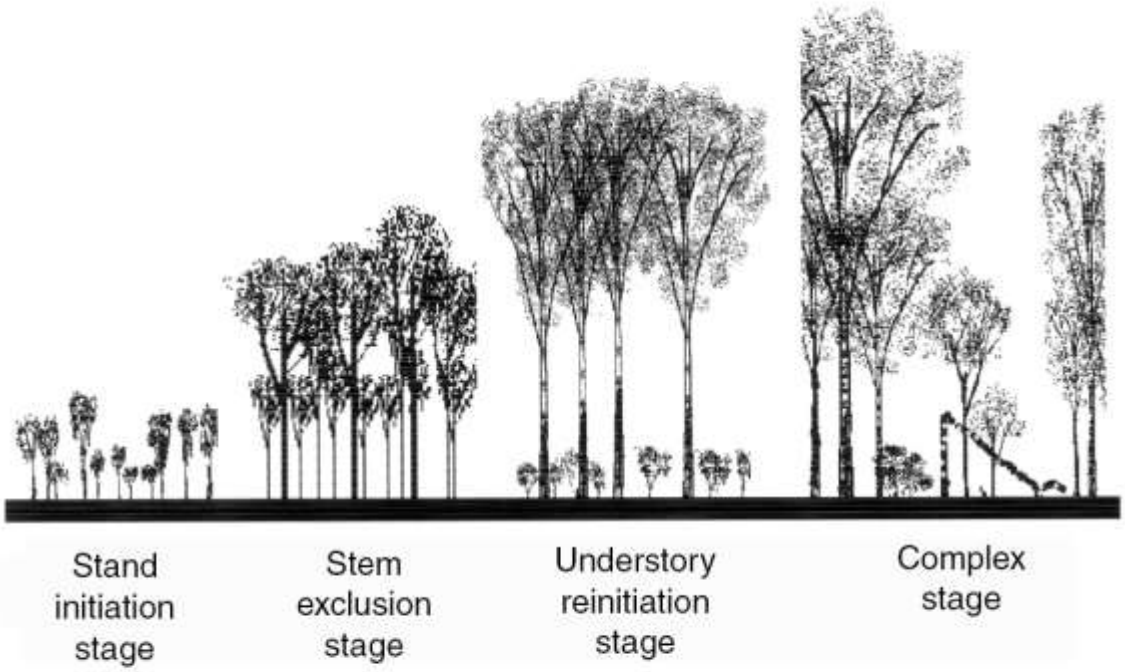


Figure 1—Stages of stand development occurring after a major disturbance that destroys all or most of the parent stand (from Johnson and others 2002).

Seedlings & Saplings Brushy

Poletimber (4”-11” dia.): Uniform age

Small sawtimber (12”-18”): Middle-aged

Mature sawtimber (19”+): Complex multi-aged habitat

Appendix A

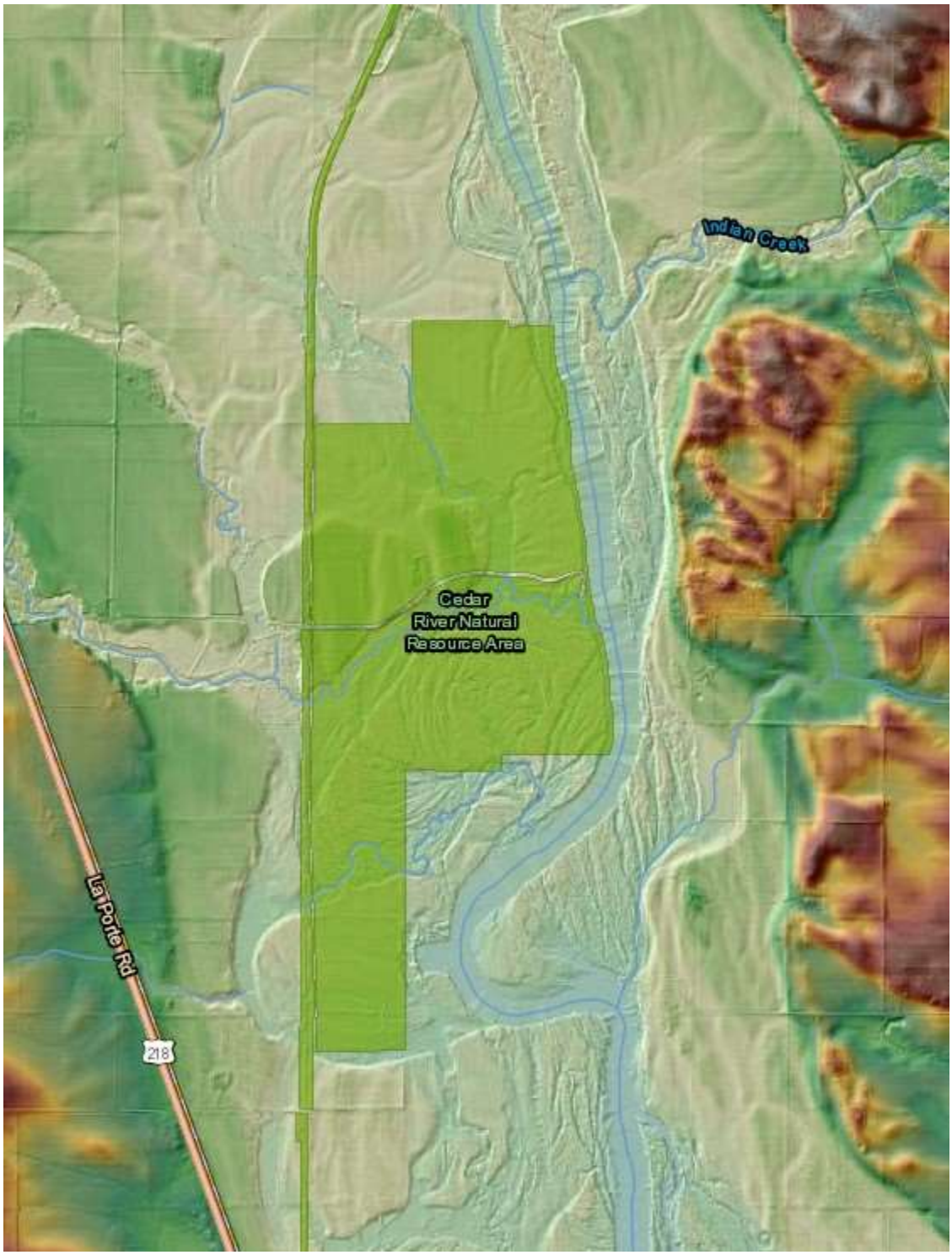


Figure 1- CRNRA elevation and Cedar River floodplain (LIDAR)

Appendix B

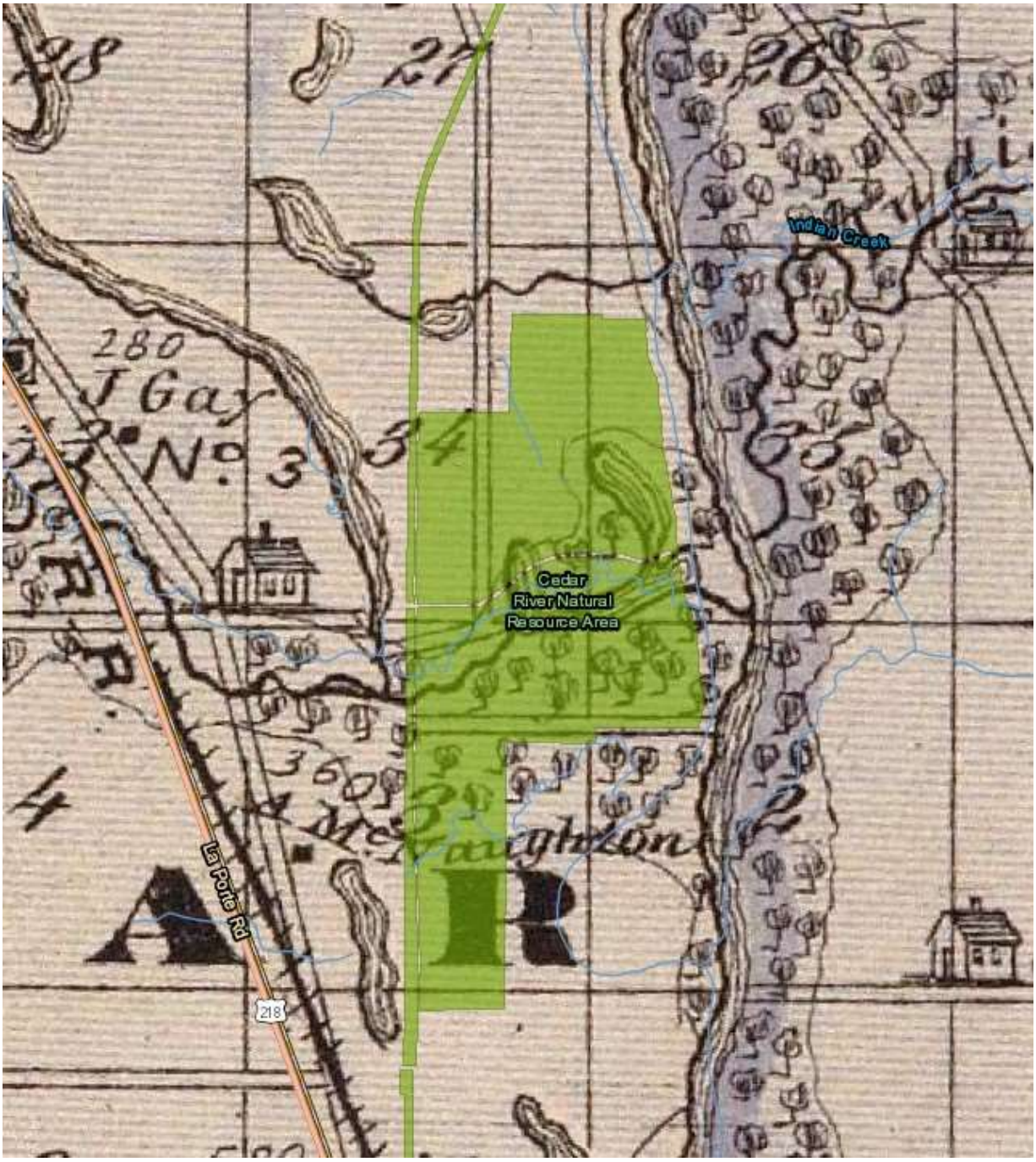


Figure 2- Atlas from 1875 showing vegetation types

Appendix C

Figure 3 - 1930's aerial photo

Figure 4- 1960's aerial photo

Figure 5- Early 2000's aerial photo

Priority Stands for Management Actions

The following recommended practices are based on working towards and achieving the goals laid out in this plan. They are seen as high priority projects in that they are feasible and practical to carry out and will have lasting positive impacts to the habitat. Not all of them must be initiated or completed at the same time. The map on the next page depicts where they would occur (Appendix 1). Definitions and technical descriptions of each practice are found in Appendix 3.

STAND 2 – (6.4 acres) This small patch of isolated woods consists of rows of planted walnut and red oak 8-12". Conduct crop tree release (CTR) to thin their canopies for full growth.

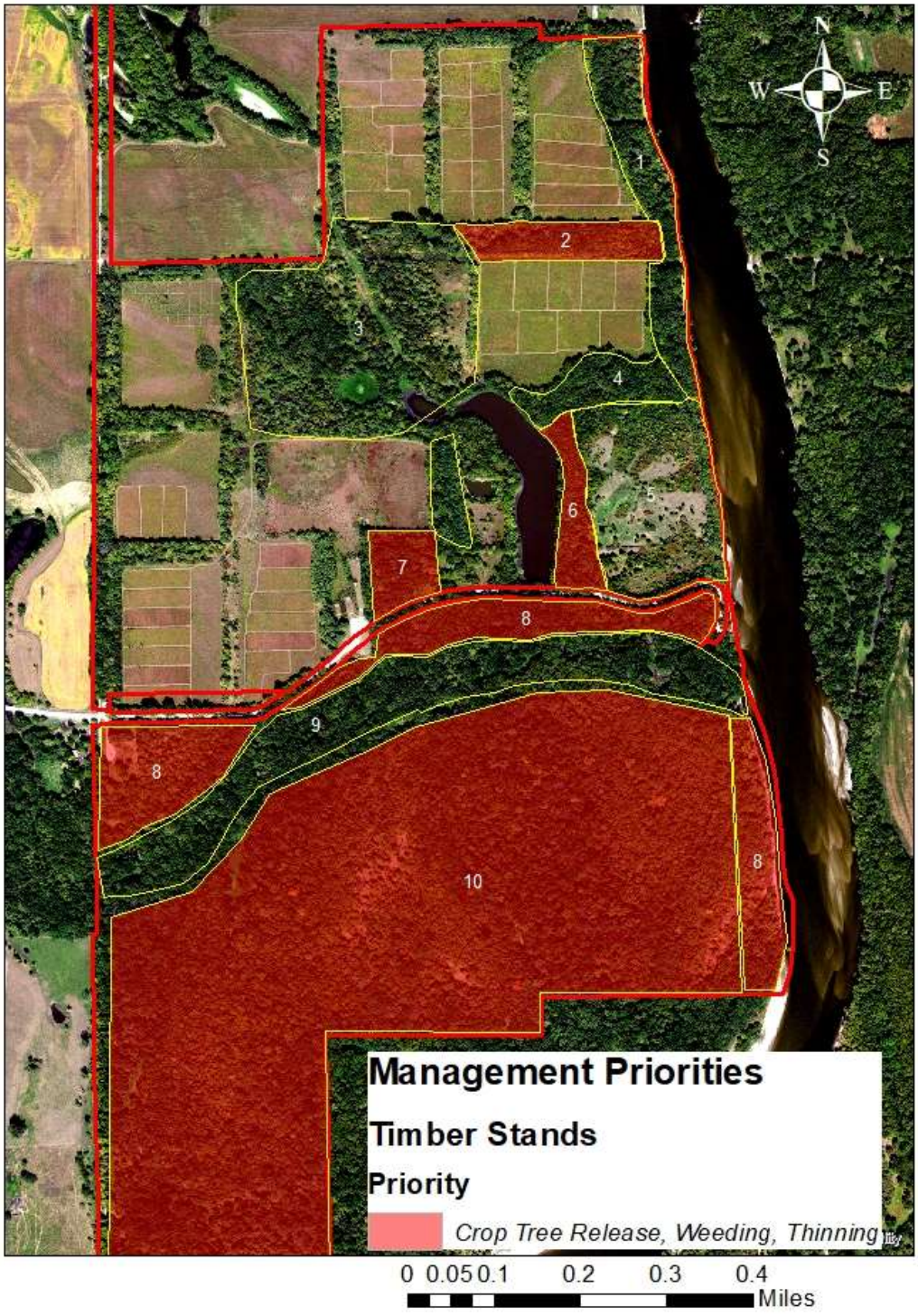
STAND 6 -- (4.7 acres) Contains pole size walnut and swamp white oak. Conduct CTR on the walnut and oak and weeding of locust and other weed trees.

STAND 7 -- (4.2 acres) This site is located on the east side of the rifle range and directly on the back side of the trap shooting range. Conduct CTR on remaining walnut poles and weed understory. The trees closets to the new trap range will have lead shot in them and must be left as a "natural shield" for the range.

STAND 8 – (29.8 acres) This stand contains young walnut, elm, hackberry, and honey locust over thick brushy habitat. There is some herbaceous layer with grasses and some forbs. Weed tree removal including invasive species and CTR of the larger trees.

STAND 10 -- (190.3 acres) This stand comprises majority of the acres in the woodland. There are scattered old large trees such as swamp white and bur oak along with some mature walnuts over the entire site. The elevated terraces formed from the old creek bed have created a diverse mix of red oak, ash, hackberry, elm, hard maple, Kentucky coffee and basswood. Silver maple dominates the wettest soils. CTR of oak, walnut, hard maple, and coffee tree along with weed tree removal is the main work. Any merchantable non-crop trees (locusts, ash, elm, and hackberry) could be harvested as part of CTR and thinning efforts to open up the canopy to allow for herbaceous growth. There are at least 20 merchantable walnuts scattered throughout the terraces.

Appendix 1


N
W
E
S
1
2
3
4
5
6
7
8
9
8
10
8
Management Priorities
Timber Stands
Priority
Crop Tree Release, Weeding, Thinning
0 0.05 0.1 0.2 0.3 0.4
Miles

Appendix 2. Complete Stand Descriptions

Stand 1
Size: 11.5 acres
Currently: This is primarily a narrow stand of mature-saw silver maple that lead down to the Cedar River bank. The trees protect the bank during flood events, provide a green viewshed for river users and is an example of a mature forest.

Recommendation: Nothing at this time. Edge feathering could be implemented 30-40' deep along the prairie/woodland face to create early successional habitat and wildlife cover.

Stand 2
Size: 6.4 acres
Currently: This stand consists of 15 rows of 8-12" diameter walnut and red oak planted 30 years ago.
Recommendation: Crop Tree Release (CTR) of best walnuts and red oaks to open the canopy to sunlight and increase herbaceous ground layer.

Stand 3
Size: 37.2 acres
Currently: Part of this stand is comprised of naturally growing silver maple, ash, and cottonwood. There are at least 30 merchantable cottonwood and a few large ash and maple. Most of this section is 10-18" diameter silver maple and is fully stocked with no understory. There is a small slough that divides this stand along with small wet pockets of backwater. On the east side there is a mix of low quality trees such as elm, ash, cottonwood amongst others. This stand also is adjacent to numerous prairie plots, providing edge habitat for wildlife.

Recommendations: Although it is not a high priority, the mature cottonwoods could be harvested to open up the canopy at this time and the younger silver maples thinned in 10-15 years. The edges of this stand could use softening by edge feathering and hinge cutting trees to create great overhead wildlife cover and early successional nesting habitat for birds. This stand provides great cover that is surrounded by prairie and the wetland to the south.

Stand 4
Size: 5.5 acres
Currently: This stand is adjacent to a small creek that runs from the wetland to the river. Silver maple and ash pole size trees (4-11") shade the creek with an understory of dense brush and young trees extending south to provide great habitat. There are few large cottonwoods present.

Recommendations: Do nothing at this time except for implementing edge feathering to the first 20-30 ft. on the stand to provide a brushy, early successional habitat for wildlife.

Stand 5
Size: 20.6 acres
Currently: This is a large, open mixture of grass, brome, and brush that is slowly filling in with trees. It will be another decade before totally becoming woody vegetation.

Recommendations: Do nothing at this time and allow natural succession to take place. Favor any hardwoods that may be on site. This stand/field provides transitional habitat and diversity to the property.

Stand 6
Size: 4.7 acres
Currently: This stand is a high priority because it contains pole-size walnut and white oak with one 24" walnut tree. The stand also contains ash, hackberry, and honey locust.

Recommendations: Implement crop tree release (CTR) to the walnut and white oak poles and remove weed trees such as locust and any invasives.

Stand 7
Size: 4.2 acres
Currently: This stand contains a wet draw and is located east of the rifle range and is also located on the back side of the new trap shooting range. Merchantable walnuts were harvested in 2018 before the trap range was built. The stand contains pole-size walnut, ash, honey locust, hard maple, and silver maple in the 8-14" range. The north side of the stand contains numerous walnut in the small saw size along some hackberry and elm.

Recommendations: Merchantable walnuts were removed in 2018 to open the area for the range. Apply CTR to remaining walnut and hard maple trees. Remove weed trees such as elm and locust and any invasives.

Stand 8
Size: 29.8 acres
Currently: This is a mix of grasses with some forbs in the herbaceous layer with raspberries, honeysuckle, gooseberry, prickly ash and dogwood overtopping the herbaceous plants. Mixed in are walnut, ash, elm, and honey locust saplings. Along the access road there is 4-10" walnut, elm, hackberry, and locust. Along the Cedar River the trees are saplings of the same species. This is a high priority site.

Recommendations: Apply CTR to walnut stands and weeding of invasives, elm, and locust.

Stand 9
Size: 30 acres
Currently: Considered the Miller Creek bottomland, this area runs from the bike trail to the Cedar River on the east. The creek has a 25 yard margin on either flank characterized by low, wet, black soil deposits. Both sides are stocked with silver maple and mature cottonwood. The maples are in irregular pockets where each pocket varies by diameter of the trees. One area dominated by 8" poles another by 12-16" and another by 16-20" maple. Maple and cottonwood are the most abundant with a little of elm, hackberry, and locust mixed in.

Recommendations: This stand is not a high priority and provides a diversity of sizes of trees although not very diverse of species. Very typical of what is found in these wetter soils. The current trees provide shading for the creek and good riparian habitat. Do nothing at this time.

Stand 10
Size: 190.3 acres
Currently: The largest of the stands and located south of the Miller Creek bottomland, this forest is fully stocked with trees. The north half of the stand contains old, large trees scattered among the pole size trees. Old trees occupy 40% of the canopy with over 80% of the understory without vegetation. The most common old trees are swamp white oak but also includes bur and red oak, honey locust, hackberry, ash, hard maple and basswood.

There are multiple terraces that contain a diverse mix of pole-small saw red oak, walnut, swamp white oak, basswood, and hard maple along with locust, elm, hackberry, and ash. Black ash and Kentucky coffee are both on high and low ground. Silver maple dominates the low, wettest soils with white elm mixed in.

The south half tends to have pole size (4-10") trees of same species with a few 20-24" present but rare. There are at least 20 mature walnut scattered throughout the stand and near the bike trail. Hawthorne are scattered in the midstory level and nettles are the dominant ground cover.

Recommendations: The most important management practice to apply is CTR! It should be done to protect the oak species, along with walnut, hard maple, basswood, and Kentucky coffee trees from locust, elm, and hackberry competition. This can be done by girdling to leave standing snags or dropping these competitive trees.

In conjunction with CTR, it is also recommended that mature, non-crop merchantable trees such as locust, ash, hackberry, silver maple, and cottonwood be thinned through a tree harvest. Harvesting these trees will remove competition, open up the canopy to allow for herbaceous undergrowth, and provide some income to the county to offset the labor involved.

Overall Summary of Recommendations

The most important silviculture technique to apply is Crop Tree Release (CTR). Its purpose should be to protect the red oak, swamp white oak, bur oak, black walnut and Kentucky coffee tree from locust, elm, and hackberry competition.

As the old oaks die, they will be replaced with locusts, ash, elm, and hackberry. To set back this succession, harvesting and thinning out these mature non-crop trees plus some cottonwood and silver maple will release the crop trees to grow, open the forest floor to sunlight, and help with regeneration of hardwoods.

Edge feathering should also be applied to any or all of the prairie plots and woodland interfaces. Hinge cutting trees 8" or less diameter will create overhead cover for wildlife while allowing the tree to resprout, providing browse for deer. This "softening" of the edge will create excellent habitat into the future.

The prairie plots are diverse in their composition due to the variety of seed mixes planted. These plots should be managed for their overall biodiversity they provide using rotational burning, mowing, cutting and invasive species control.

In all, this is going to be exceptional river bottom woodland with very good numbers of pole-size trees of good species and quality. These trees are waiting to take their place in the canopy and this plan is a key element to improve and maximize the current forest in place.

Update this plan as soon as all practices are completed or in 15 years, whichever comes first.

Implementation of this Plan

This plan should be presented to the County Conservation Board and public stakeholder groups prior to implementation. Upon broad approval of the recommendations made in this plan, the DNR District Forester and/or a Forester Consultant along with the Black Hawk County Conservation staff will work together to implement the recommended practices. Private contractors may also be used to carry out certain activities.

Environmental Considerations

Threatened and Endangered Species. A review of the state's Threatened and Endangered (T&E) GIS database should be visited before implementing parts of this plan, especially if there will be a tree thinning or harvest involved.

One species that needs to be noted is the *Northern Long-eared bat* – This bat has recently been listed under section 4(d) of the Endangered Species Act. This section is tailored to areas affected by white-nose syndrome which includes the entire state of Iowa. The rule is designed to give flexibility to landowners, land managers, and government agencies within the species range and to minimize regulatory requirements. The rule also is designed to protect the bat during its most vulnerable life cycle stages of breeding and hibernation. A list of conservation measures and more details are found at the USFWS website www.fws.gov. The staff will review and follow these guidelines where applicable.

Forest Health, Invasive Species, and Integrated Pest Management. Limit machinery and heavy equipment as much as possible to reduce the incidence of physical damage and scarring to trees. Limit heavy work to winter months to prevent compaction. In oak stands, avoid cutting or pruning during the growing season. The primary invasive species at CRNRA are bush honeysuckle and siberian elm In designated management areas, work aggressively to reduce and control these species; elsewhere, work to contain them as best as resources allow.

Water Quality & Soil Protection. Intensive management activities that require heavy machinery such as log skidders or endloaders should be limited to winter months when the ground is frozen or during periods when the soil is firm and dry. Concentrate travel to established trails and roads as much as possible to minimize compaction over large areas. Follow all guidelines in the Iowa DNR Forestry Best Management Practices booklet, available online from the Iowa DNR website.

Appendix 3. Technical Description of Practices

Edge feathering is a management practice applied where a woodland edge meets up with bare ground, crops, or grassland habitat. A stark contrast between the two habitats is not natural and does not provide the gradual, brushy transition that many species of wildlife prefer for travel and movement; thus, the purpose of edge feathering is to soften the edge between the two cover types. This is accomplished by cutting or killing all the tall trees in a 50-75-foot wide strip along the edge of the mature timber. This results in a flood of sunlight which causes new growth to rapidly colonize the area. The trees that were cut generally sprout back and add to the cover and browse. Shrubs such as dogwood, plum, raspberry, and blackberry also colonize the new sunlight and offer fruit and flowers for insects & birds. This practice is often recommended as a way to reduce nest parasitism of interior forest birds by the brown-headed cowbird. After 15-20 years, the forest has grown back up and the practice can be repeated.

An example of edge feathering 5-10 years after treatment.

Commercial timber harvesting
Timber harvests are done to rejuvenate old woodlands (restart succession) and to capture value from hardwood products before they are lost. Rejuvenating old woodlands and replacing them with a vigorous, fast-growing, youthful stands promotes carbon sequestration, stand health, and benefits certain wildlife.

To be considered sustainable and renewable, timber harvests need to ensure prompt and adequate regeneration of new trees after harvesting. This is done by having a silvicultural plan and by seeing that plan through and making adjustments as needed.

A professionally trained consulting forester should be utilized to assist with all timber harvests/sales. The trees should be marked with paint and the price secured prior to cutting. A contract should be used to establish rules regarding the timing of harvest, access, and other details.

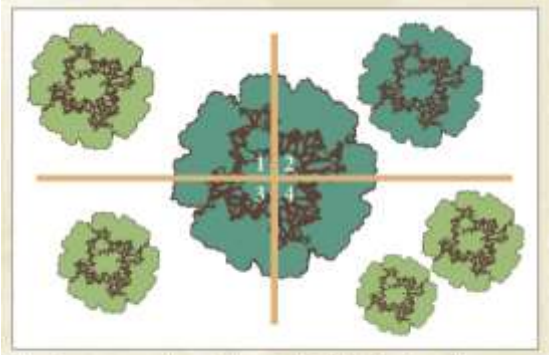
Thinning (Crop Tree Release)
Crop tree release is a simple form of thinning which concentrates growth on only a few, chosen trees. Crop trees are chosen based on the following core attributes: species, form, health, and crown:

- *Species:* Favor oaks, hickories, and other hard-mast species. Also favor unique or less common species, such as sycamore, for variety and forest diversity.
- *Form:* Choose only trees that have strong central leaders and strong crowns. Don't select trees with forked stems, narrow branch angles, or crooked trunks unless.
- *Health:* Select trees that have good health and predictably long lifespans. Avoid choosing trees with signs of disease or decline, dead limbs, epicormic branches, or long-lasting damage.
- *Crown position & size class:* Crop trees should show a genetic predisposition to fast growth and dominance over weaker trees. They should have either dominant or co-dominant crowns in the main stand canopy. Intermediate or suppressed trees won't respond to release and should be avoided.

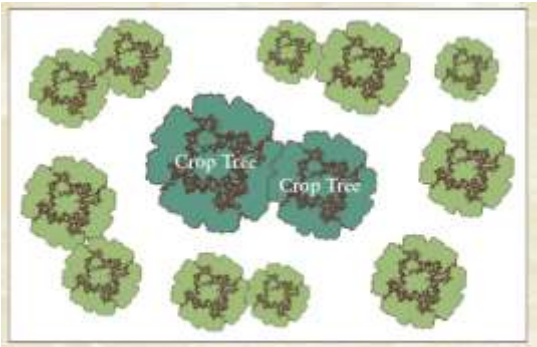
Crop tree distribution will vary depending on the number of trees that are available which meet the above criteria. There may be as few as 5-10 crop trees per acre in some stands, or as many as 50-100 in others. Choose as many crop trees as possible, at the most uniform distribution. If diameters are 4-11", space crop trees 10-15 feet apart. In stands where the average tree size is 12" or greater, space crop trees 20-30 feet apart.

When you have selected a good balance of crop trees throughout the stand, release them on all four sides of any competition touching or overtopping their crowns (see figures below). In older stands with larger trees, sometimes a 2 or 3 sided release is all that can be done. This can be done either by felling or girdling (felling preferred as long as no damage is done to the chosen crop trees).

For more details on crop tree management, refer to the US Forest Service document "Crop Tree Management in Eastern Hardwoods" available online.



The space around a crop tree is divided into four sides or quadrants for thinning.



Two crop trees growing close to each other are treated as a single when thinning around them.

Appendix 3. Additional Woodland Management Resources

Contract Labor & Advice. Professional forestry consultants & contractors offer tree planting services, timber stand improvement, timber appraisals, and more. There are over 30 such individuals & businesses in Iowa who offer this type of work with experience and education in forestry & silviculture. A list of these private consultants/contractors can be obtained by visiting the ISU Forestry Extension website given below.

Online information & articles.

- Iowa State University Forestry Extension: www.forestry.iastate.edu
- Iowa DNR Forestry website: www.iowadnr.gov/forestry/index.html