
Forest & Wildlife Habitat Management Plan

Hartman Reserve Nature Center

Black Hawk County Conservation Board

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Introduction

The purpose of this document is to serve as a “Master Plan” for forest management activities at Hartman Reserve Nature Center. This plan is also a working document which means it needs to be able to reflect the ongoing changes of the natural environment and forest community. Active woodland management can improve the quality & diversity of forest habitat for wildlife while optimizing other forest benefits such as recreation, beauty, environmental health, and forest products.

Overall goals for wildlife habitat & forest resources were established by County Conservation and Nature Center Staff. This plan compliments the goals and recommendations identified in the *Hartman Reserve Nature Center Management Plan (revised 2010)* and the Hartman Bluff State Preserve Plan (2003). The Wildlife Conservationist performed field surveys to develop an inventory (stand map) of the current species composition and habitat structure of the forested portions of the nature center property. The DNR District Forester reviewed this plan and added input. The stand survey provides the basis for recommended forest management practices which could be used to achieve the desired goals & objectives identified in the HRNC Management Plan and in this Forest Resource Plan.

General Description of the Property

Hartman Reserve Nature Center area is located in the heart of Metropolitan Waterloo/Cedar Falls. It consists of over 300 acres of land along the Cedar River. Approximately 90% of the area has some type of forest cover. The area is site to the largest tract of publicly owned upland hardwood forest (approx. 47 acres) in the county. The area also contains the Hartman Bluff State Preserve (46 acres).

Areas of Hartman (primarily lowlands) have been heavily disturbed in the past due to past land practices such as over-harvesting of trees, grazing, and mining for sand/gravel. This was evident during stand mapping along with viewing historical aerial photos of the site. (See 1930's Aerial Map)

The terrain and soils of the lowland at Hartman are a complex arrangement of alluvial soils ranging from fine clays to coarse sands & loams that lend to a highly diverse species mix of plant communities. The upland forest consists primarily of silty clay loam – sandy loam soils with 18-60% slope derived from glacial till. As implementation of various management efforts occurs, it will be important to appropriately match the targeted plant/species community with the local soil type.

What makes Hartman Reserve unique is the natural resources and educational/recreational opportunities it provides in an urban setting! Recreational activities include wildlife watching, fishing, mushrooming, hiking, snowshoeing, cross-country skiing, maple syruping and much more. Due to its urban setting and high number of park visitors, Hartman is an excellent site to demonstrate forest management practices and provide forestry education to the public. Additional information about Hartman Reserve Nature Center can be found at www.blackhawkcountyparks.com.

Wildlife Habitat & Forest Resource Background and Goals

Iowa's forest's including Black Hawk Counties have dramatically been altered since settlement in the 1830's. Overharvesting trees for fuel, building materials, land development, and grazing along with the loss of natural disturbances such as fire have shaped what are now Iowa's forests. Due to the loss of these disturbances, Iowa's oak population has seen significant declines. According to the *IDNR Forest Action Plan*, “Iowa lost 11% of its oak /hickory forest between 1990 and 2008 due to lack of disturbance and lack of active management on private

and public forest land. An ecosystem's forest type affects the wildlife habitat, herbaceous cover, wood products, recreational opportunities, and economic value of that ecosystem. Wildlife that depends on oak-hickory trees for habitat and food may not be able to survive without them; many of the common herbaceous plants found in oak-hickory stands cannot tolerate heavy shade."

Due to the significant role the oak tree has in a forest ecosystem, Hartman Reserve started actively managing several "stands" (White Oak, Red Oak & Lucy's Meadow) within the upland and lowland forest in the late 1990's. The original work was in partnership with Bob Hibbs, previous DNR District Forester. Activities included crop tree release of hardwoods (oaks, hickories, walnut) along with harvesting 41 trees (basswood, ash, maple) in the White Oak stand to open up the canopy for oak regeneration. A complete record of this work is found in the attached *HRNC Forest Management Timeline*. Follow up surveys have shown some regeneration success but there needs to be continued follow-up work in these stands and others.

During this time frame, the **Friends of Hartman** approved the following Forest Management Goal:
"Regenerate oaks in Hartman Reserve Nature Center and provide educational opportunities and volunteer participation in forest management."

In 2009 the **Black Hawk County Conservation Board** adopted a **Forest Management Vision Statement** which reads:

"The overall vision for forest management in Black Hawk County parks is to actively manage timber resources for various successional forest stages and sustainable, multi-use benefits including recreation, wildlife habitat, biodiversity, and forest products while earning revenue and providing educational opportunities for the public."

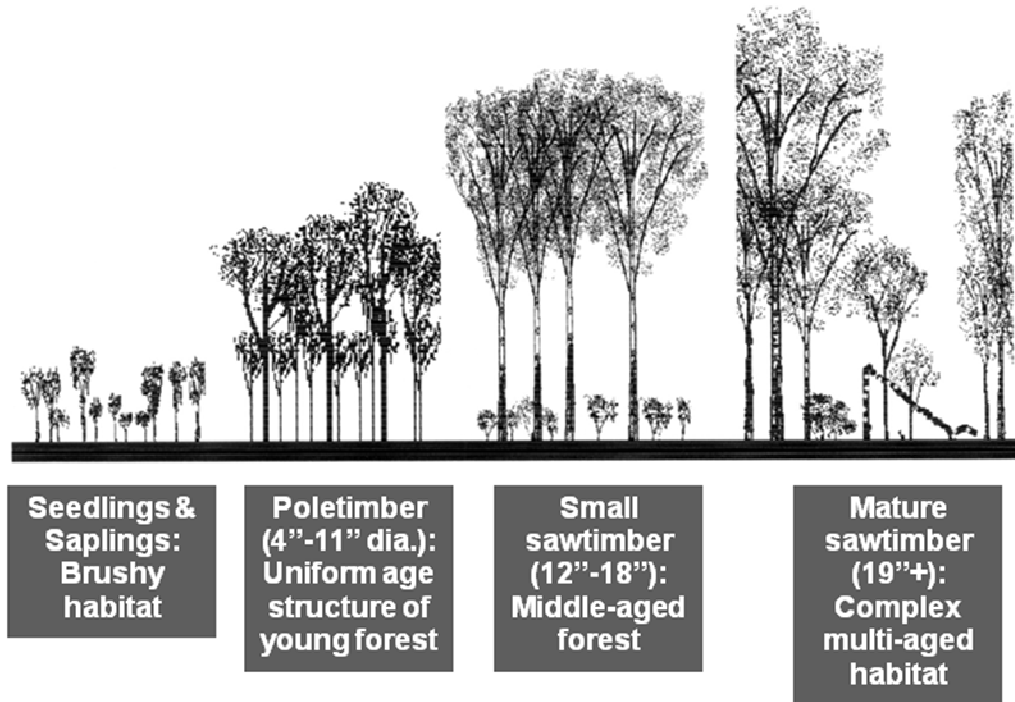
To achieve this overall vision and goal for Hartman, the wildlife conservationist and unit managers will work with public and private entities to inventory our timber resources and implement timber stand improvement (TSI) practices with a goal of regenerating hardwood species, primarily oaks, hickories, and walnuts while partnering with the staff of Hartman Reserve Nature Center to provide educational opportunities.

The following are objectives identified in the Forest and Wildlife Habitat Resource Management Plan:

- Manage the forest to enhance and optimize the wildlife habitat for a variety of wildlife species.
- Retain oaks as a long term component of the forest focusing specifically on white and red oak regeneration
- Manage the "Sugar Bush" for sap production and education/recreational opportunities
- Enhance biodiversity of plant communities
- Maintain high quality recreational opportunities
- Various successional forest stages represented within the area
- Invasive species removal and control

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 change:



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, owls, and kestrels. 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, and browsing. 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 white-eyed vireo.

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.

Another important woodland habitat type in Iowa is the **oak savanna** or open oak woodland, which is generally defined as a combination or transition between grassland and forest cover. Oak savannas have a few large mature oak trees at wide spacing and the rest of the habitat in native prairie/wildflowers. It has a pleasing “park-like” appearance and is used by many types of wildlife including red-shouldered hawks, redheaded woodpecker, deer, turkeys, and many more. Savannas need routine fire to keep tree encroachment in check while allowing the fire-tolerant oaks to gradually replace themselves. Without burning, savannas fill in with trees and become forests. In many parts of Iowa, conservationists are restoring savannas that have grown up to forest over the past century by manually cutting and removing the in-growth, and reintroducing fire.

Recommended Priorities for Management Actions

The following recommended management practices are based on working towards and achieving the goals laid out in this plan. These stands 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 nor completed at the same time. Definitions and technical descriptions of each practice are found in the Appendix.

Upland

1. Stands 2 & 3 (Sugar Bush) - 8.2 acres total

These stands are crucial for the future of maple syruping activities at the center! Both stands are similar in that the main canopy is comprised of primarily mature 18"+ oak, basswood, ash, and occasional mature sugar maple. Most mature sugar maples show stress and decay and are in decline which results in less sap production. Stand 2 has more densely stocked sapling-pole size hard maple, oak, hickory, elm, and ironwood compared to Stand 3. Both stands are heading towards a climax upland forest.

I recommend thinning/crop tree release in both stands along with weeding of select ironwood which will accomplish the following...

- 1) Increase light to forest floor to encourage herbaceous plant and root development.
- 2) Increase crown and stem development in select sugar maple and oak/hickory trees which should in turn increase sap and sugar production in sugar maples.

2. Stand 8 (White Oak North/South) – 8.6 acres total

This stand is split by a ravine running east/west from the school and is a high priority due to past management efforts for oak regeneration. There is a fairly open canopy of mature (18"+) white oak at the south end transitioning to a mix of mature white & red oak, hickory along with a mid-story of primarily hard maple, ironwood, hickory, basswood, and elm at the north end.

Work needs to continue of thinning the canopy to promote oak and hickory natural regeneration along with planting oak seedlings. Crop tree release pole size hardwoods and maintain area with burns and/or periodic thinnings so oak seedlings do not get outcompeted. This would be an excellent site to place an interpretive sign explaining the work being done.

3. Stands 5 and 7 (Red Oak I & II) – 2.8 acres total

This stand is a high priority due to past thinning and plantings done in the late 1990's – early 2000's (see HRNC Forest Management Timeline). Both stands are comprised of mainly mature red and white oaks along with a few mature ash and basswood. Both sites were originally thinned and then planted with mostly red oak seedlings and caged. Both sites need continued follow-up work which includes additional thinning/crop tree release if necessary, weeding, and shelters placed on favorable seedlings. Maintain approx. 50 trees/acre if tubed.

Lowland

4. Stand 11 (Lucy's Meadow) – 12.5 acres total

A high priority due to past management activities in the late 1990's to current. An open canopy of small saw timber walnut, with some mature coffee tree, cottonwood, and locust along with many snags due to thinning efforts. Site has been planted with swamp white oak, bur oak, and walnut seedlings over past decade. Good regeneration of kentucky coffee tree seedlings in areas. Needs surveyed for planting success and protected with tree shelters. Could also plant oaks in areas with open canopy. Crop tree release of oaks needs to continue on north side pond and invasive species controlled.

5. Stand 13 – 17 acres total

Comprised of primarily pole size (4-11") maple, ash, hackberry, boxelder with some scattered walnuts. There are several higher ridges containing mature bur oak surrounded by good numbers of sapling-pole size oak. This would be an excellent area for crop tree release/thinning of young trees and weeding of undesirable species to create openings in the canopy to encourage oak regeneration. This is a probable future release site for Blue-spotted Salamanders which require a closed, shaded canopy with shallow depressions so this project may dictate what if any TSI work is done.

6. Stand 15 - 36 acres total

This stand has a mix of good numbers of small saw timber - mature saw timber walnut and oak. The mature walnuts area showing rot/decay at their bases from flooding. Crop tree release/thinning would be very beneficial at this time to encourage crown development and growth. This site would be a good candidate to implement the Shelterwood harvest/regeneration method 15-20 years from now to regenerate walnuts.

7. Stand 17 – 19.8 acres total

There are good pockets of mature saw timber (18+) walnut and oak. The area also has a decent population of sapling-pole size bur oak between Shirey Way and the lake that would benefit from crop tree release/thinning. There is approx. a 2-3 acre site containing very mature walnuts where a small Shelterwood harvest/regeneration project would be beneficial. This area could also be direct seeded with walnut to speed up the process. This is an excellent time to apply both of these practices.

Implementation of This Plan

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

Other Considerations

Hartman Bluff State Preserve. All or sections of Stands 3-10, and Stand 13 are located within the state preserve. Stands 5, 7, and 8 were being managed for oak regeneration before the preserve was established in 2005. The State Preserve Resource Management Plan should be reviewed before proceeding with further TSI.

Species of Greatest Conservation Need (SGCN). The Hartman Reserve Management Plan (Revised 2010) contains a thorough listing of flora and fauna species known to exist and be present in the area. Some of these species are listed as threatened or endangered in the state and are found within Hartman. The HRNC Resource

Management Plan needs to be reviewed and considered before work begins. In many instances these forest management recommendations may assist with habitat improvement for some of these SGCN.

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 Hartman is bush honeysuckle and reed canary grass. The HRNC Plan has a complete listing of additional invasives. 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, tractors, or skid steers 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.

Archeological, Cultural, and Special Sites. If there are any unique archeological, cultural, or historic sites of significance present, they should be carefully considered in concert with any proposed management activities. Such sites might include original cabins, human burial sites, special land features, or artifact caches.

Forest Appearance/Aesthetics. Due to the urban environment and high visibility of Hartman Reserve, the public's viewshed will be considered when implementing the work. For example trees that are dropped could be removed for firewood and the tops piled for wildlife cover or dropped flat to the ground. Factors such as staff safety and equipment access will play a role in determining what can be done at each stand. This additional work will be determined on a stand-by-stand basis.

Appendix 1. Complete Stand Descriptions

UPLAND STANDS

Stand 1

Size: 4.5 acres

Currently: Partly in a conservation easement and located behind neighbors homes. Mix of pole (4-11") and small saw (12-18") timber of basswood, elm and hickory. A few mature red oak and hard maple scattered throughout along with cottonwood and young catalpa lining the parking lot. Shrub layer consists of pockets of dense invasive honeysuckle.

Recommendation: Cut and treat honeysuckle and catalpa along parking lot. Crop tree release best hard maples for sap and sugar production.

Stand 2 (Sugar Bush I)

Size: 6.4 acres

Currently: Primary canopy consisting of mature (18" +) white oak, red oak, basswood and occasional mature hard maple with fairly well stocked numbers of pole size (4-11") white oak, sugar maple, and occasional hickory. Understory well stocked of sapling sugar maple, hickory, elm, and ironwood. Most mature maples showing stress/decay reducing sap production. Site looks to have been cleared in past due to several age classes represented. Stand slowly moving from oak/hickory forest to shade tolerant climax forest. Little to no herbaceous cover due to overstocking which is contributing to soil and gully erosion.

Recommendation: Due to its proximity to the Sugar Shack and primary source of sap for syruping, the site should overall be managed for sap and maple syrup production but should not be managed as a monoculture of maples. Crop tree release on the healthiest small saw timber sugar maple and oak using diameter X2 method. Due to overstocking in some areas, the understory will also need to be weeded of ironwood and some sapling maple to provide sufficient light for tree and herbaceous growth. In general a sugar bush should have 50-60 sugar maple trees/acre or spaced approx. 28ft. apart.

Stand 3 (Sugar Bush II)

Size: 5.8 acres

Currently: Dominant canopy of good numbers of very mature saw timber (18"+) red and white oak, basswood, ash, and a few sugar maple in this size class. Some gap mortality due to die-off of these mature species. Co-dominant species includes a mix of small saw timber (12-18") hard maple, hickory, basswood, and understory primarily sapling-pole size elm, sugar maple, basswood, hickory, and some cherry although not as densely stocked as stand 2 but similar in composition. Little to no oak reproduction and moving to climax forest.

Recommendation: Manage similar to stand 2 for maple sap production but also oak regeneration. Where there is canopy gap mortality, thin and weed around the edge of the gap to expand it and plant and tube red/ white oak seedlings along with hickory. Thin these openings into the future as necessary to reduce competition from faster growing species.

Stand 4

Size: 5.7 acres

Currently: Similar to stand 3 but not in the "Sugar Bush". Mature saw timber red oak, basswood, and hickory and scattered small numbers of 12-18" basswood, red oak, and pockets of cherry. Understory primarily consists of basswood, elm, ironwood, and some hard maple along with shrubs such as prickly ash, blackberry/raspberry and some honeysuckle along parking lot edge. Fairly good herbaceous ground layer including sedges and a small pocket population of the Beak Grass.

Recommendation: Remove invasive honeysuckle along parking lot. A population of rare Beakgrass is present which requires part-full shade so any TSI work needs to avoid this population. Crop tree release of oaks, hickories and cherry trees or stand can be left alone this time.

Stand 5 (Red Oak II)

Size: 1 acres

Currently: Good numbers of mature-small saw timber of white and red oak with some mature ash and basswood. Understory comprised of pole-size basswood, elm, hackberry, hickory, and some hard maple. Very little to no natural oak regeneration. Site was thinned in late 90's and several hundred oaks were planted. (See HRNC Forest Management Timeline)

Recommendation: Follow up work includes additional monitoring plus re-thinning, weeding of area and crop tree release of favorable hardwoods. Protect natural seeded or planted oak seedlings with tree protections (cages/tubes) and if necessary replant with new oak seedlings at 50/acre. Monitor site for seedling mortality. Work in this stand could overflow into Stand 4.

Stand 6

Size: 6.6 acres

Currently: This stand encompasses the creek bottom and east/west facing slopes of the ravine. Majority of the stand is comprised of pole size (4-11") hackberry, elm, ash, boxelder along the creek and small saw timber of

hard maple, red oak and basswood on highest elevations. There is spotty herbaceous and shrubby cover due to gap mortality.

Recommendations: Possibly continue small thinnings along creek bank to encourage more herbaceous cover to help with stream bank erosion or do nothing at this time.

Stand 7 (Red Oak I)

Size: 1.8 acres

Currently: Areas containing high stem density of early successional saplings of hard maple, basswood, elm, hickory and ironwood. Also areas of dense shrubby thickets of brambles, honeysuckle, and blackberry out shading spots along with pockets of poison ivy. Mostly open canopy consisting of mature-small saw timber white and red oaks, with occasional basswood and hickory. Some natural regeneration of oaks evident but being out-competed in areas. Stand was thinned and planted with acorns and oak seedlings in late 1990's-early 2000's. (See HRNC Forest Management Timeline) Some tree cages are still present. Lousewort is also present in a small patch which is usually found in open, upland woodlands.

Recommendations: Cut and treat honeysuckle and leave brambles for bird habitat. Re-thin areas if necessary and crop tree release of young oak seedlings. Identify natural seeded or planted seedlings of oaks and tube and plant additional seedlings (50/acre) if necessary. Leave mature oaks for mast production and girdle remaining undesirable mature trees such as basswood for wildlife habitat. Monitor tree tubes/seedlings for mortality. Partially open canopy where Lousewort is present and monitor for response to treatment.

Stand 8 (White Oak North/South Zone)

Size: 8.6 acres total (Stand 8 is split by a ravine running east-west from River Hills School)

Currently South Zone: Moderately open canopy of mature saw timber (18"+) white oak with a mix of scattered small saw timber white oak, hickory, and hard maple with occasional basswood. Site was originally thinned in mid-late 1990's and managed with periodic burns to create an open oak/savanna habitat. Herbaceous cover includes native sedges and goldenrod. Recently a volunteer has re-cleared brambles and blackberries to open the area back up. Little white oak regeneration has occurred naturally. Several large tree cages are seen.

Recommendations: Drop and chemically treat remaining basswoods and hard maples or girdle and leave standing for wildlife. Finish thinning/removing maples and basswoods near Grand Blvd. and leave oaks/hickories for seed production. Dropped trees can be used for firewood. Tube any oak seedlings from natural production and plant white oak nursery stock seedlings (min. of 50/acre). Monitor tubes/seedlings for mortality and manage by burning, mowing, or periodic thinning.

Currently North Zone: The south end of this zone (near ravine) was thinned in the late 1990's and contains a good population of primarily 11-18+" white oak and hickory with scattered numbers of pole size (4-11") hickory, elm, hard maple, and a few white and red oak in this size. The canopy is more densely closed at the north end of the zone and consist of sporadic mature saw timber white/red oak transitioning to small saw timber of hickory, basswood, ash, and maple. The understory contains good numbers of 4-10" maple, hickory, elm and basswood saplings. A small patch of Beak Grass is also present.

Recommendations: Finish thinning and weeding south end of zone working to the north end leaving oaks and hickories for mast production. Girdle mature undesirable trees for wildlife habitat. Crop tree release of pole size oaks. Tube any oaks from natural reproduction and inter-plant with white and red oak seedlings from nursery stock. Manage with controlled burns, mowing, and thinning. Monitor tree shelters for mortality.

Stand 9

Size: .2 acres

Currently: Thinned in late 1990's. for oak regeneration. Contains early successional (saplings) of ash, maple, hickory, and basswood including brambles and blackberry. Several oak saplings survived from seedling planting in early 2000's.

Recommendations: Crop tree release/thinning around planted oaks and invasive species removal.

Stand 10

Size: 5.8 acres

Currently: Located north of the school the main canopy consists of mature (18+) white and red oak along with ash and basswood of same size (similar to stand 8). Heading north into the stand it transitions to mature canopy of basswood, hard maple, and ash with occasional red oak with an understory well stocked of sapling size hard maple, basswood, and ironwood. Good population of 8-10" sugar maple but access is difficult to establish a sugar bush and collect sap.

Recommendations: Crop tree release of any young oak/hickory or nothing at this time. This could be a future site for white/red oak regeneration.

LOWLAND STANDS

Stand 11 (Lucy's Meadow)

Size: 12.5 acres

Currently: Site includes Gentian Prairie and Turtle Pond. Mostly open canopy of pole-small saw timber walnut with scattered mature cottonwood and walnut. Many snags due to previous TSI work with some areas near the pond containing pole size hackberry, ash, locust, hickory, elm, and a few red oak. A small pocket of mature coffee tree and small patches of canary grass found in wettest soils. Good reproduction of Kentucky coffee tree in areas. Herbaceous layer of sedges and weeds along with early successional growth.

Recommendation: Control invasive species (canary grass, honeysuckle, autumn olive) with spraying and cut/stump treatment. Finish crop tree release of oaks/walnuts around pond and tube or cage previously planted or natural reproduction oaks/walnuts seedlings on entire stand. Possibly plant more seedlings (bur oak, walnut) in open canopy areas. Finish thinning and weeding north of pond.

Stand 12 (South Riverside Trail)

Size: 14 acres (includes trail surface)

Currently: An old rail line converted to paved recreational trail. The trail shoulder and ditch contains a mix of mature-pole size walnut, oak, boxelder, elm, hackberry, ash, and other bottomland species. Also holds invasives such as honeysuckle. Owned by both Waterloo/Cedar Falls with all three agencies managing cooperatively.

Recommendation: Salvage harvest if applicable of nut producing trees for trail safety/maintenance or remove and use as firewood. Cut and stump treat honeysuckle.

Stand 13

Size: 17 acres

Currently: Predominant species consist of pole size (4-11") hard maple, black ash, hackberry, hickory, boxelder, elm, and occasional walnut in this size. Highest ridges contain scattered mature saw timber (18"+) bur oak with sapling-pole size bur oaks scattered near parent trees along with some small saw timber walnut and pole size red

oak. Wettest soils contain scattered numbers of saw timber soft maple, ash, and locust. This stand represents a 2 age stand created by some past disturbance such as grazing or logging. Work should not adversely affect the future release of Blue-spotted Salamanders in this stand!

Recommendations: Crop tree release of bur/red oaks and young walnuts. Create small clearings near and around mature bur oak for more sunlight to promote natural regeneration or plant with seedlings. Take into consideration Blue-Spotted Salamander habitat!

Stand 14

Size: 10 acres

Currently: An old tree nursery with a bisecting trail includes a few acres of tallgrass prairie on the north side surrounded by a mix of old brome grass with pole-saw timber size oaks, ash, with scattered clumps of honeysuckle and poison ivy. Oak seedlings have occasionally been planted on site over the years.

Recommendations: Manage primarily as an open oak savanna and prairie for wildlife diversity. Remove invasive species and periodically spray brome and seed with prairie as time and resources allow. Let oaks seed into site naturally or plant and tube more oak seedlings. Girdle or drop other tree species other than oaks. Manage with controlled burns and mowing.

Stand 15

Size: 36 acres

Currently: Main canopy has good numbers of mature saw timber (18"+) walnut and bur oak along with occasional saw timber hackberry and locust. Mature walnut showing rot/decay at base. There also is scattered-good numbers of small saw timber-pole size (4-18") walnut along with some ash in this class. Majority of the stand is pole size (4-11") hackberry, maple, basswood, ash, coffee tree, boxelder, ash, elm followed by numerous hackberry saplings. Site shows history of possible past grazing due to multiple age classes.

Recommendations: Crop tree release/thinning of healthy young oak and walnut stands for crown development. There are good areas to implement a shelterwood harvest/regeneration method 15-20 yrs. from now.

Stand 16

Size: 54 acres

Currently: Very wet soils. Mostly mature saw timber cottonwood and pole-mature size soft maple with occasional hackberry.

Recommendations: Do nothing at this time. Example of late successional lowland forest.

Stand 17

Size: 19.8 acres

Currently: Stand 17 canopy is comprised primarily of 10" – 18"+ saw timber walnut, bur oak, hackberry, and ash with a majority of the oak located between the lake and Shirey Way. Some of the largest walnut is found in this stand. There are several patches of sapling-pole size bur oak. Understory is mostly sapling size hackberry, elm, boxelder, black ash and a few hard maples. Similar to stand 15.

Recommendations: Crop tree release/thinning of young oak and walnut at this time. There are several areas in this stand that an oak and walnut regeneration project could begin now. There is a 2-3 acre site of mature walnut where now would be a good time implement the shelterwood method. This site needs TSI first and then can be direct seeded along with naturally seeded before harvesting mature trees 5-10 years from now.

Stand 18

Size: 36 acres

Currently: Includes Cooley Str. and Sherwood Park flood buyouts. Fairly open canopy with some mature - small saw timber walnut, oak, cottonwood, and soft maple along boxelder, honeysuckle, elm, and hackberry making up the understory. All buildings are removed and some neighbors are mowing at this time.

Recommendations: Crop tree release young hardwoods. Plant 50 seedlings/acre and tube of walnut, swamp white, and bur oak, direct seed or let it naturally fill in. Control weeds for 2-3 years around shelters with chemical or mowing & maintain shelters. Sherwood Park needs gated before work begins.

Stand 19

Size: 26.3 acres

Currently : Canopy consists of mature saw timber locust, cottonwood, ash, elm, and bur oak. Good pockets of pole size (4-11") bur oak on ridges. Very few walnut. Understory primarily is pole-small saw timber ash, hackberry, elm, locust, boxelder, and soft maple in wettest areas.

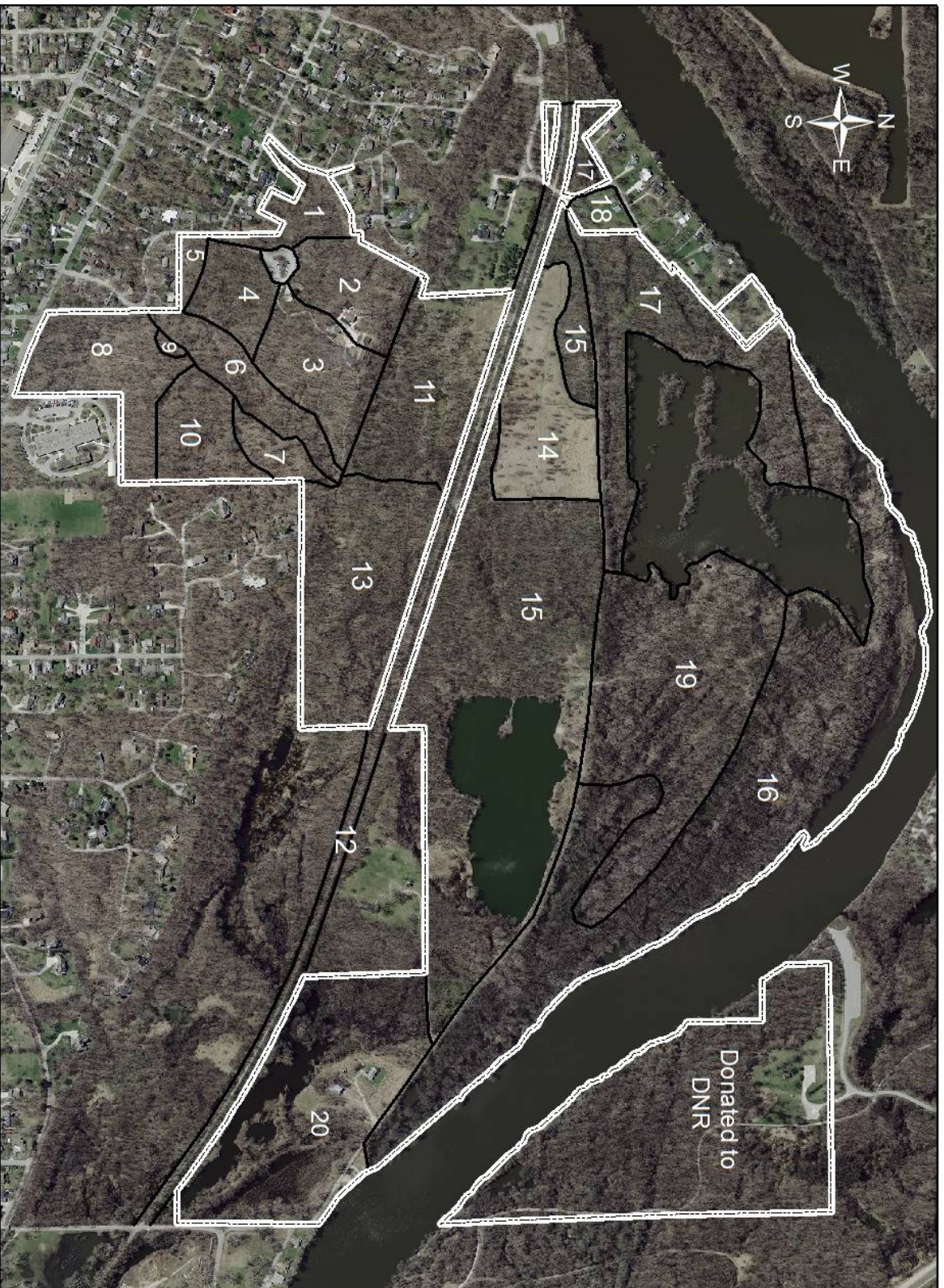
Recommendations: Crop tree release/thinning of any young oak and walnut at this time.

Stand 20

Size: 18.5 acres

Currently: Wet soils with primarily pole-small saw timber cottonwood, locust, and soft maple with occasional mature bur and small saw timber walnut. Understory contains 4-11" ash and elm. There is a several acre willow thicket next to N Hackett Rd.

Recommendations: Crop tree release any walnut and oak when time and resources allow or nothing at this time.



Hartman Reserve Forest Stands 2013

DISCLAIMER: Ownership boundaries do not represent legally surveyed lines. Map for forestry purposes only.



Hartman Bluff State Preserve



DISCLAIMER: Ownership boundaries do not represent legally surveyed lines. Map for forestry purposes only.



Sherwood Park Flood Buyouts Stand

DISCLAIMER: Ownership boundaries do not represent legally surveyed lines. Map for forestry purposes only.



Hartman Reserve Lidar Terrain (Includes Flood Buyouts)

DISCLAIMER: Ownership boundaries do not represent legally surveyed lines. Map for forestry purposes only.

Appendix 2. Technical Description of Practices

Technical Description of TSI Thinning Operations

Timber Stand Improvement activities will center around two themes: 1) thinning overcrowded young or mid-rotation stands to achieve optimal spacing for health & fast growth; and 2) weeding & culling in old/mature stands at or just before harvest time. A description of each process is provided below.

Crop Tree Management

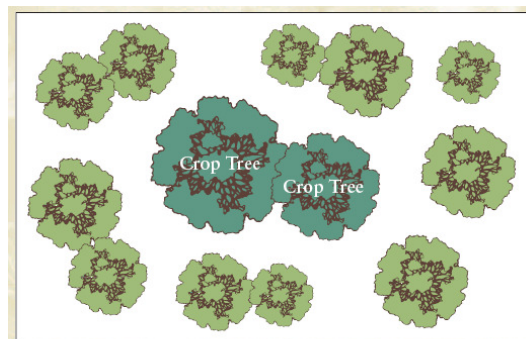
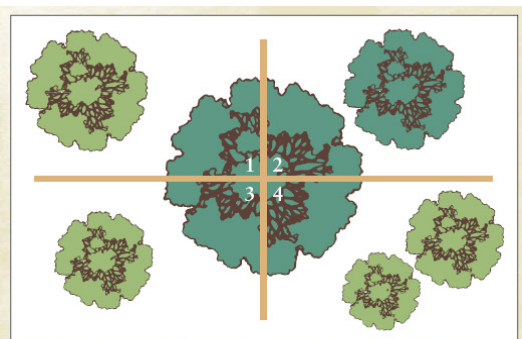
Crop tree management is the process of selecting and managing specific trees to maturity in a woodland. At maturity, there is only room for 40-50 large, dominant trees per acre. Practicing crop tree management involves pre-determining which trees in your woods will be these final 40-50 trees. The selection process should begin when the trees are still young and in the pole-sized stage (4-11 inches diameter), but can be applied to older stands in certain situations.

Crop trees can achieve multiple objectives of providing wildlife value, timber production, and overall stand diversity. With this in mind, crop trees should always be selected based on the following core attributes: species, form, health, and crown:

- *Species:* Favor oaks & hickories for their wildlife benefits, and silver maple for its sawtimber value. Avoid choosing elms as crop trees since they have a limited lifespan.
- *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 and should be in the largest diameter class. Intermediate or suppressed trees won't respond to release and should be avoided.

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 by felling or girdling. No chemical application is warranted. 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

To increase wildlife value through this practice, trees that are cut can be "hinged" and directionally felled into brushpiles during the growing season. This practice leaves part of the tree attached so that it resprouts for browse and cover, while also creating dense brushpiles of tree canopies with their leaves still attached.



Weeding & Culling

Weed & cull tree removal can be done anytime during a stand's rotation to improve species composition or aesthetics, but it isn't absolutely necessary until the stand is ready to be regenerated.

A "weed tree" is any species of tree that doesn't meet your management objectives for whatever reason --- commonly they are trees that tend to be thorny, messy and/or spread easily, have brittle or weak wood, are short-lived, may be non-native, have little wildlife value, or do not grow into attractive or valuable trees for lumber or shade. While one person's list of weed trees may differ slightly from another's, most people accept the following species as common weed trees found in the forest: **boxelder, mulberry, elm, honeylocust, ironwood, honeysuckle, buckthorn, and autumn olive**. To some people, hackberry, basswood, bitternut hickory, and ash are also weed species, but it depends on your situation.

Weed trees can usually be killed by felling or girdling and by applying herbicide to the fresh wound. Herbicide treatments may include Tordon RTU, Pathfinder II, or straight Roundup (41% glyphosate). The best time to accomplish this work is late summer, fall, and early winter when sap is being moved down to the roots for winter storage. Chemical treatment of weed trees should generally be avoided in late winter and spring when the sap is rising, as it will not be as effective. Follow all label instructions as required by federal law.



Stump cut chemical treatment



Chainsaw girdle treatment

Technical Description of Harvest/Regeneration Operations

Harvesting can be done to establish a new generation of desirable trees, to create early successional forest habitat for wildlife, or to salvage value from mature/declining trees for reinvestment into other habitat projects w/ management expenses. Not all harvest activities are commercial ventures, depending on what species are present, their quality, and quantity --- in some areas, there may be no merchantable trees to sell. If a harvest area contains merchantable trees, they will be sold as markets allow; all other non-merchantable trees will need to be managed so they do not impede the establishment of the next generation of seedlings.

Harvest/regeneration areas will be designed as irregularly-shaped polygons to promote a natural appearance and provide for adequate natural reseeding by surrounding trees.

Regeneration of cut stands will be done by one of 2 methods, depending on the environmental conditions of the site, stand conditions, and objectives: 1) shelterwood; 2) clearcut. Both natural regeneration and artificial (hand planting) may be used under these systems.

The **shelterwood** method is a process that occurs over a 5-15 year period, *before* harvesting. It is used to get desirable seedlings established on the site using natural regeneration in partial shade. *Phase 1* of a shelterwood involves heavy weeding & culling (see technical description above) of the understory and mid-story layers, allowing increased levels of diffuse sunlight to reach the ground. Some overhead canopy trees may also be removed if they are of undesired species that we don't want seeding in to the next generation, but no more than 50% of the overhead canopy should be removed. High quality trees of desirable species are retained to drop

seed and naturally germinate in the partial shade. (The result after Phase 1 weeding/culling is a stand that appears “park-like”). In *Phase 2*, the stand is given time to establish a new generation of seedlings on the ground. If necessary, competition from weeds, grass, and sprouting weed trees are controlled to maintain the shelterwood environment, and certain practices such as mowing, herbicide application, or scarification may be used to improve seedbed conditions. Seedlings may also be hand-planted at this time if desired, to speed up the process. The new generation of desirable seedlings are allowed to grow to chest height, at which point they are established and ready for more sunlight. At this point, which begins *Phase 3*, all remaining overstory trees may be harvested & sold, releasing the young seedlings to full sun. An alternative option would be to remove half of the residual overhead canopy trees, allowing enough sunlight to grow the new generation but keeping some old growth trees for roosting, shade, mast, and aesthetics, creating a 2-aged stand.

The **clearcut** method is simply removing all trees from a small patch (3-5 acres in size) to give full sunlight for rapid growth & high stem density. Trees that are merchantable can be sold, and all other non-merchantable trees are cut off at the root collar and either killed chemically (weed species) or allowed to resprout (culls). 5-10 trees per acre which weren’t merchantable are girdled and left to die standing for wildlife snags. The site can then be replanted or regenerated naturally.

Hand planting will occur mainly on well-drained sites that can support hard-mast trees such as walnut, oak, coffeetree, and hickory. These sites will be identified prior to harvest based on species composition and vegetation type. Trees will be planted at a reduced rate (50 per acre, i.e. one every 30 feet at uniform spacing) so that extra resources may be invested in their survival. Animal protection devices (vented tree tubes 4-feet high or a metal wire cage) should be placed around every tree to not only reduce depredation but help in locating & nurturing trees in coming years. Competition from sod grasses should be chemically controlled as necessary during the first 5 years of the seedlings’ life. Also, the trees should be inspected every 10 years or so to ensure they are not being overtopped or outcompeted by faster-growing bottomland trees (perform crop tree release as needed).

Supplemental natural regeneration will provide “trainers” throughout the regeneration area to help the planted hardwoods grow tall and straight, self-pruning lower branches as the stand ages. These trees will arise naturally from well-dispersed seed of surrounding bottomland stands of soft maple, cottonwood, willow, et al. A good mineral seedbed in the early spring is all that will be needed to provide for this. Chemical control of weeds/grass may be needed to provide proper seedbed conditions in the early years.

Reed canary grass (RCG) can be a particular challenge in regenerating floodplain stands. The best short-term control for RCG is herbicide; the best long-term control is shade. RCG cannot survive in dense stands of towering trees, and it dies out in thick, young thickets of willow, soft maple, or cottonwood. Therefore, quickly establishing a thick stand of trees is crucial to successful forest regeneration on these sites. If RCG does gain a foothold, the only way to combat it will be with herbicides and mowing to re-establish the seedbed conditions needed for natural reseeding of trees into the site. For this reason, it will be advised that all tree tops, debris, and slash from harvests be cleared off to the side so that spray equipment may have access to a site if necessary

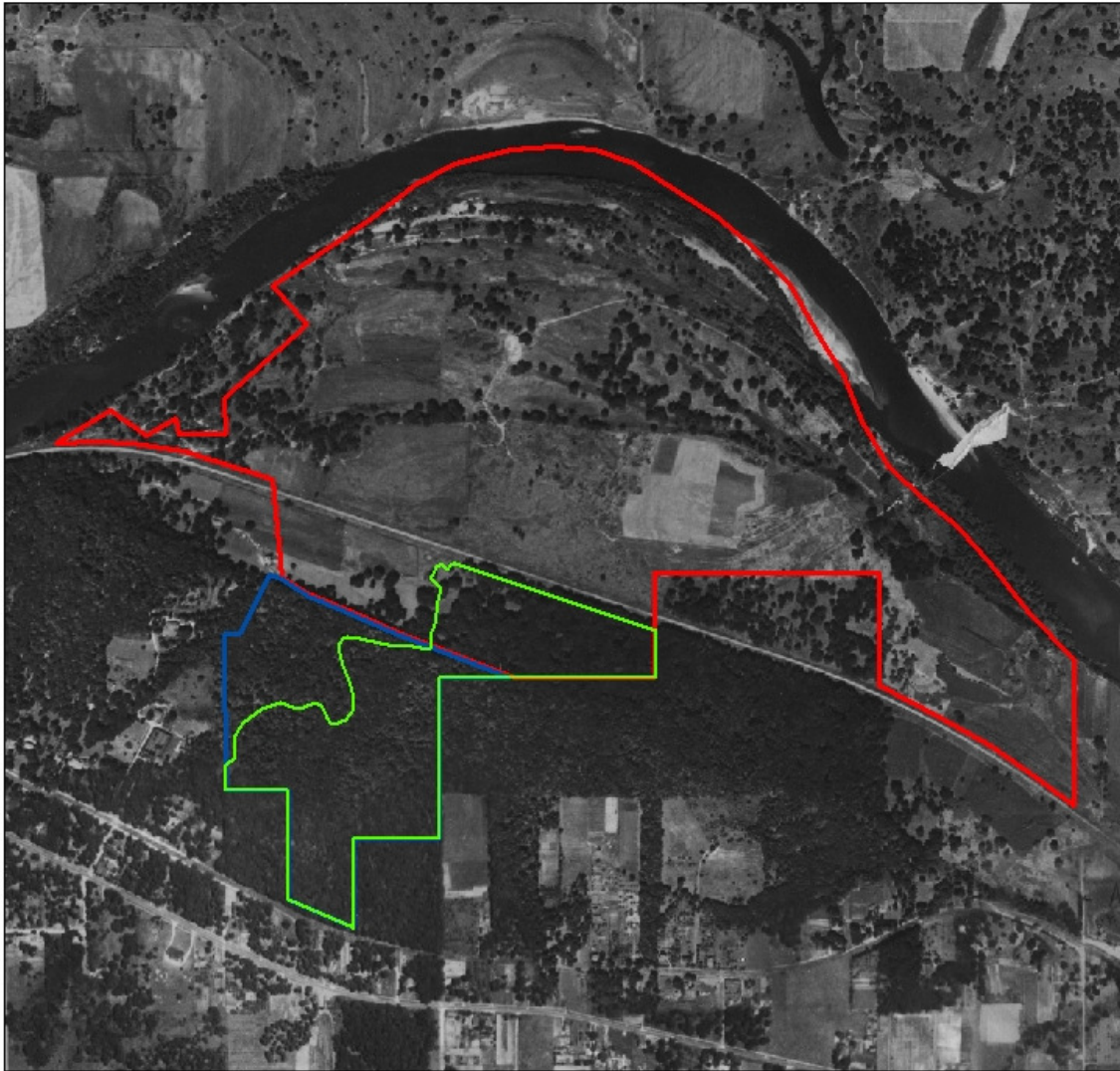
Additional Woodland Management Resources

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 contacting me or by visiting the ISU Forestry Extension website given below.

Plan information & articles.

- Iowa State University Forestry Extension: www.forestry.iastate.edu
- Iowa DNR Forestry website: www.iowadnr.gov/forestry/index.html
- Iowa's Forest Action Plan (IDNR, 2010)
- Hartman Reserve Nature Center Management Plan (rev. 2010)
- Hartman Bluff State Preserve (2003)
- A Silvicultural Guide for Developing A Sugarbush (USFS, 1974)
- Sugar Bush Thinning – strategies for improved tree health and sap sugar production: (Cornell University, 2010)
- Maple Syrup Production: (Iowa State University Forestry Extension, 2010)

1930's Aerial Map of Hartman



Legend

-  Hartman Bluff State Preserve
-  Hartman Reserve Upland Forest
-  Hartman Reserve Lowland Forest

0 75 150 300 450 600 Meters



1930's Aerial Photo
Interpreted from 2009 Aerial Photo
Cartographer: Jameson Grier (2010)

**Hartman Reserve Nature Center
Forest Management
Time Line**

Mission Statement

Hartman Reserve Nature Center, which is owned and managed by the Black Hawk County Conservation Board, was created to

“Preserve and manage a unique natural area and provide a better understanding of our environment through education, recreation, and community involvement.”

Goal

To preserve and manage the oaks of Hartman Reserve Nature Center, the Black Hawk County Conservation Board has proposed a forest management plan. The priority of this plan is to:

“Regenerate oaks in Hartman Reserve Nature Center and provide educational opportunities and volunteer participation in forest management.”

1. **White Oaks** - To regenerate *white oaks* in the uplands (South Unit), the plan calls for using controlled burns and selective cutting in the 10 acre River Hills Stand of the Hartman forest. Since 1999 the following management activities have been conducted:
 - Small maples, ashes and basswoods were girdled in southern zone in the summer of 1999.
 - The southern zone was burned on October 27, 1999
 - Small maples, ashes and basswoods were girdled in the northern zone in the summer of 2000.
 - The northern zone was burned on October 31, 2000.
 - A total of 41 mature maples, ashes and basswoods were logged in River Hills Stand in the winter of 2000.
 - The parts of the northern zone were burned on November 7, 2001.
 - The southern zone was burned on November 16, 2000.
 - The southern zone was burned in the fall of 2006
 - The northern zone was burned in 2009

2. **Red Oaks** - To regenerate *red oaks* in the uplands (South Unit), the plan calls for selective cutting in two separate areas. Red Oak Stand I is .6 of an acre and Red Oak Stand II is 1.1 acre. Since 1999 the following management activities have been conducted:
 - A. **Red Oak Stand I** - This .6 acre site is located south of the Mary Kay Eakin Bridge.
 - Small maples, ashes and basswoods were girdled in June/July of 1999.
 - Red Oak acorns were scattered by volunteers in the fall of 1999.
 - Mature maple, ash, basswood and white oak were logged in the winter of 2000.
 - Red Oak acorns were scattered by volunteers in the fall of 2000.
 - Red Oak acorns were scattered by volunteers in the fall of 2001.
 - Small maples, ashes and basswoods were girdled in the summer of 2002.
 - Removed maple and basswoods, caged red oak saplings in the fall of 2009

 - B. **Red Oak Stand II** - This 1.3 acre site is located south of the Kay Romanin Bridge.
 - Small maples, ashes and basswoods were girdled December 15, 1999.
 - 100 red oak seedlings were planted in the spring of 2001.
 - Additional small maples, ashes and basswoods were girdled during August of 2001.

- 100 red oak seedlings were planted in the spring of 2002.

3. **Bur, Swamp White & Red Oak** - To regenerate oaks in the floodplain, the plan calls for selective cutting and burning in the following stands.

A. Lucy's Meadow - This 9 acre unit is located in the southwest lowlands of the South Unit.

- Elms and cottonwoods were girdled in July of 1999.
- Bur oak acorns were scattered in the fall of 1999.
- Swamp white oak seedlings (25) were planted in the spring of 2000.
- Additional elms and cottonwoods were girdled in July of 2000.
- Bur oak acorns were scattered in the fall of 2000.
- Twelve, 8 foot bur and red oaks were planted in 2003.
- 100 bur oak seedlings were planted in 2005.

B. East Manatt Lake - This one acre unit is located east of Lake Manatt Lake in the North Unit.

- Elms, hackberries, boxelders were girdled in August of 2001.
- This site was burned in the fall of 2001.

C. Prairie Trail – This 10 acre site in the north unit has been planted with over 500 red oak, bur oak, swamp oak, white oak and walnut seedlings since 1990. Volunteers have placed tree cages on these seedlings to protect them from deer browsing. Parts of this unit have been burned

