Hartman Reserve Nature Center

Management Plan

"Hartman Reserve Nature Center is dedicated to understanding our environment through education, recreation and community involvement and to stewardship of a unique natural area."

Adopted by the
Black Hawk County Conservation Board

Hartman Reserve Nature Center
is owned and managed by
Black Hawk County Conservation
Board

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RECORD OF ANNUAL REVIEW & FIVE YEAR REVISIONS

Approved by the Black Hawk County Conservation Board on July 5, 1990

Annual Review	Reviewer & Date
2011	
2012	
2013	
2014	
2015	
2016	
2017	
2018	
2019	
2020	
2021	
2022	
2023	
2024	
2025	
2026	
2027	
2028	
2029	
2030	

Five Year Revisions	Date & Reviewer
1996	June 12, 1996
2001	June 18, 2001
2006	December 12, 2006
2010	May 7, 2010 by Matt Frana, Mary Cox, and Jameson Grier (UNI)
2015	
2020	
2025	
2030	
2035	

TABLE OF CONTENTS

APPENDIX

1) History and surveys
- 1.1) History
- 1.2) Description of Hartman Reserve Nature Center Environment
- 1.3) Evaluation of Undergrowth in the Hartman Bluff State Preserve
- 1.4) Botanical Survey 2006
- 1.5) State Preserve Physical Description

2) Species List
- 2.1) Flora
- 2.2) Amphibians and Reptiles
- 2.3) Birds
- 2.4) Mammals

3) Criteria for Hartman Reserve Nature Center Management Plan

4) Non-Native Invasive Plant Procedures

5) Forest Management Timeline

6) Burn Management History

7) Deer Management
- 7.1) Deer Management History
- 7.2) 2008-2009 Progress Report
- 7.3) 2009 Hunting Application and Rules

8) Osprey
- 8.1) Cedar Valley Osprey Project
- 8.2) Osprey Map
- 8.3) Released Osprey Band Numbers

9) Archaeology
- 9.1) Overview
- 9.2) Maps

10) Blue Spotted Salamander
- 10.1) Overview
- 10.2) Work Plan

11) MFA 2007 Grant Narrative

12) Dedication Records
- 12.1) Manatt lease
- 12.2) Hartman Bluff State Preserve dedication records

13) Monitoring Sheets
- 13.1) Prescribed Burns
- 13.2) Tasks Performed

14) Volunteer Waiver

15) Mussels
- 15.1) Mussel Articles
- 15.2) EPA Grant
- 15.3) REAP Grant

16) Maps

17) Additional Information to Add to Update

PART 1: HARTMAN RESERVE NATURE CENTER MANAGEMENT PLAN

Hartman Reserve Nature Center's (HRNC) statement of purpose was approved by the Black Hawk County Conservation Board (BHCCB) on January 6, 1979 and amended on November 5, 1995, February 6, 1997, and May 2010. Hartman Reserve Nature Center is owned and managed by the BHCCB for the following purpose:

"Hartman Reserve Nature Center is dedicated to understanding our environment through education, recreation and community involvement and to stewardship of a unique natural area."

I) HARTMAN RESERVE NATURE CENTER HISTORY

John C. Hartman, historian and editor of the Waterloo Courier, led an effort to raise the necessary funds to purchase the land that became HRNC, expressing his desire that "one of the few remaining tracts of virgin timber be preserved in its natural state." The land was purchased in l938 and donated to the YMCA, which used it as a camp until it was purchased by the Black Hawk County Conservation Board in l976.

Originally, HRNC contained approximately 39 acres of upland forest, the largest publicly owned tract of upland timber in Black Hawk County. The remaining 41 acres consisted of disturbed lowland forest and a one acre prairie remnant. This was all south of the current Cedar Valley Bike Trail and was historically called the south unit.

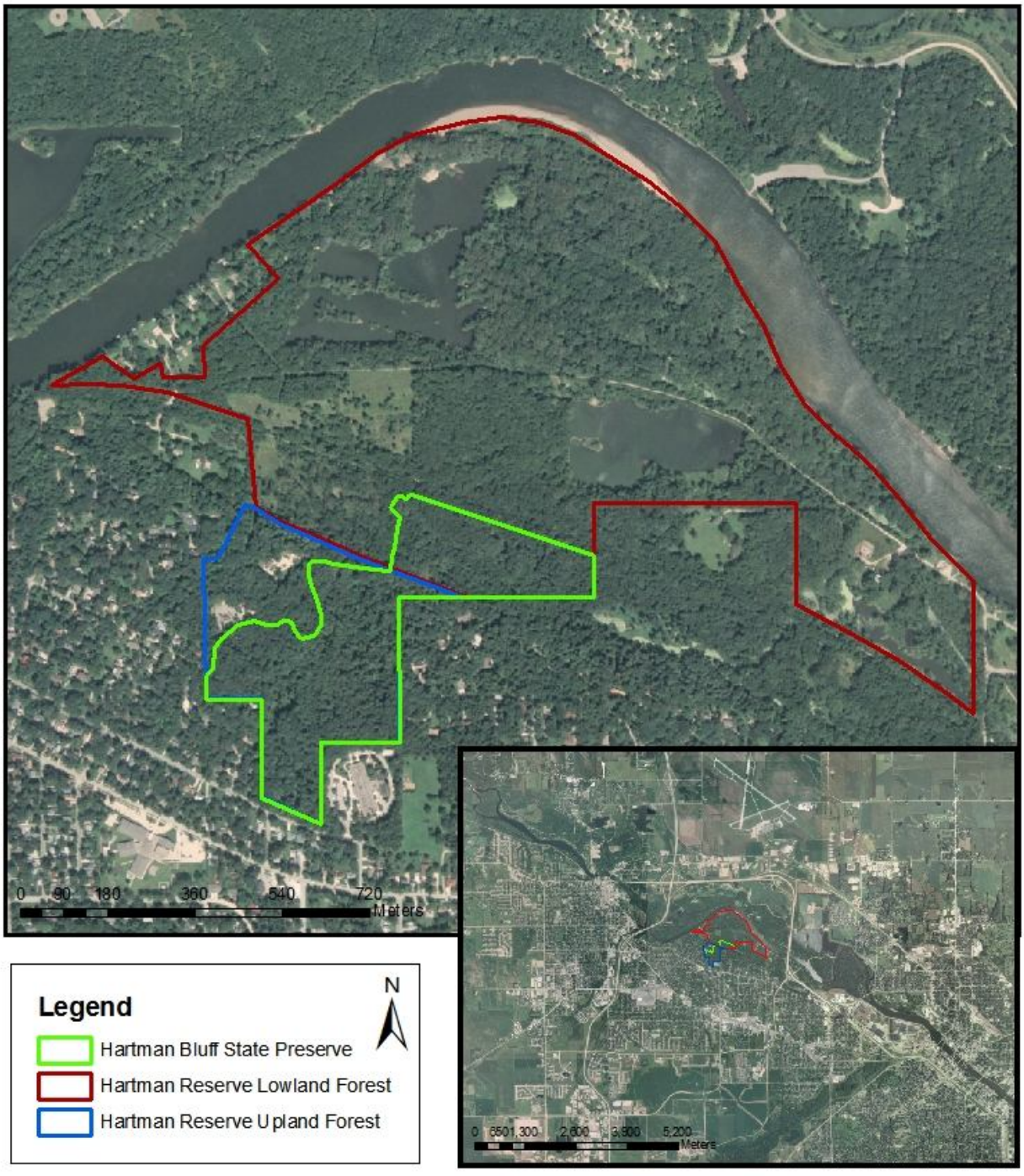
In 1990, a total of 180 acres was leased from the Manatt Corporation (Appendix 12.1). This addition was north of the current Cedar Valley Bike Trail and was called the north unit. The north unit contains 25 acres of water in the form of two lakes created from sand and gravel mining, an abandoned 10 acre nursery and 145 acres of floodplain forest. Shirey Way, the road which bisects the north unit, was closed to vehicle traffic and converted to a recreation trail/service road.

In 1994, an additional 27 acres was added to the north unit through lease, purchase and donation. This addition included a small gravel pit, a boat ramp, a house and garage. In 1995, a parking lot was constructed to provide access to the north unit from North Hackett Road and the boat ramp was upgraded. The City of Waterloo acquired two lots at the north end of Cooley Street as part of floodplain buyouts following the 1999 flood, and transferred ownership of the 1 acre to BHCCB in 2002. The City of Cedar Falls transferred 7 acres of land to BHCCB in 2003. In 2005, a 0.4 acre of land was purchased to the west of the parking lot. Development easements were signed with adjacent landowners on two other lots totaling 0.6 acre. Including the easements, the nature center now manages a total of 301 acres.

The Iowa State Preserves Advisory Board recommended to the Governor of Iowa that 46 acres of HRNC be included in the Iowa State Preserve System in 2004. The Governor of Iowa signed the Articles of Dedication to create the Hartman Bluff State Preserve in 2005 (Appendix 12.2). A complete history and surveys can be found in Appendix 1.

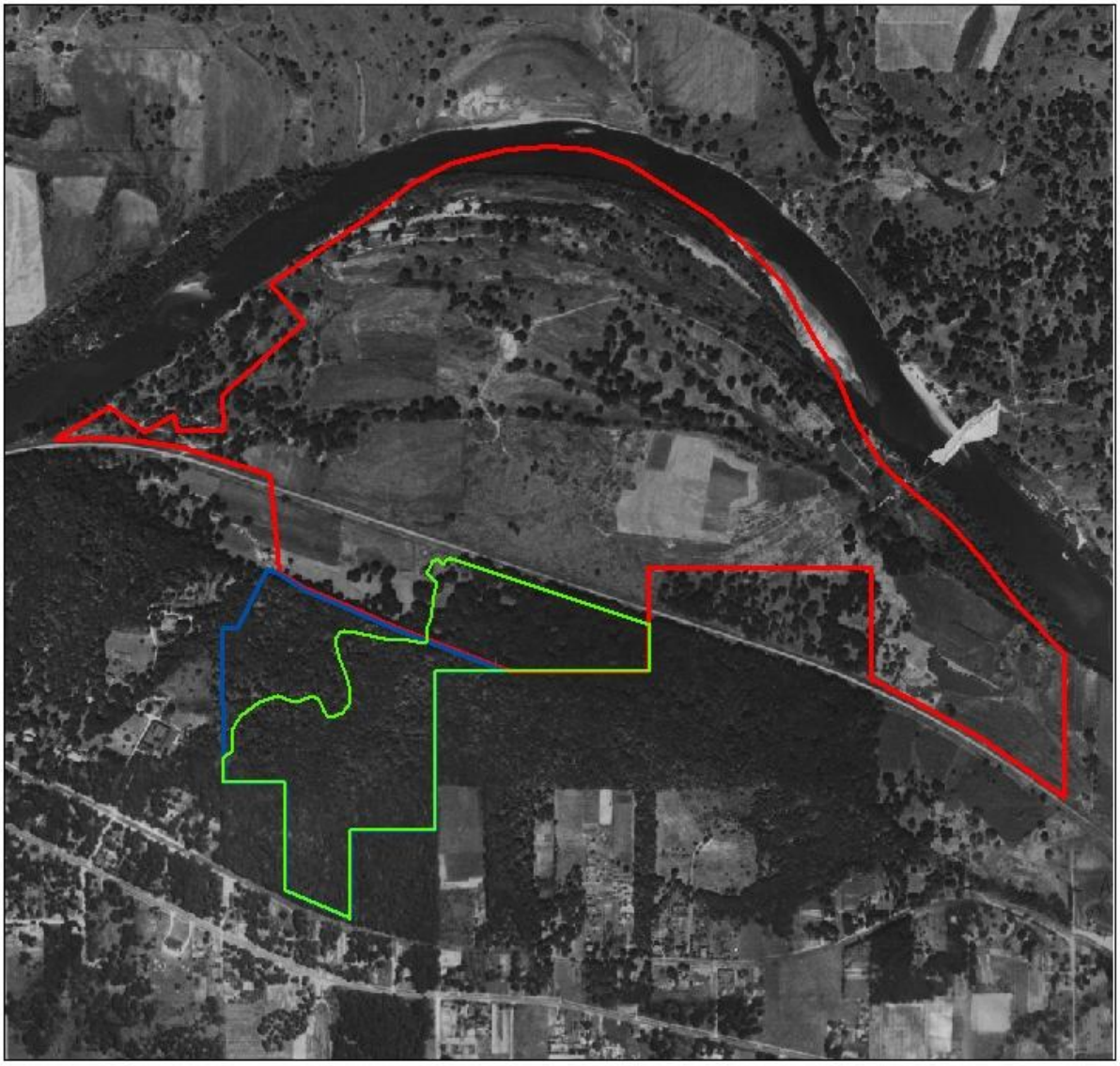
Hartman Reserve Nature Center has always had a close relationship with George Wyth State Park. The two organizations have been partners on management issues such as deer management, blue-spotted salamander conservation, osprey release, and mussel surveys. The land of both organizations creates a 1400 acre George Wyth/Hartman habitat complex that is divided by the Cedar River, and shares a variety of species and recreational opportunities. Therefore, efforts should be made to continue to foster the strong management relationship between HRNC and George Wyth State Park to achieve beneficial outcomes for both organizations.

Hartman Reserve Nature Center



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

1930's Aerial Map of Hartman



Legend

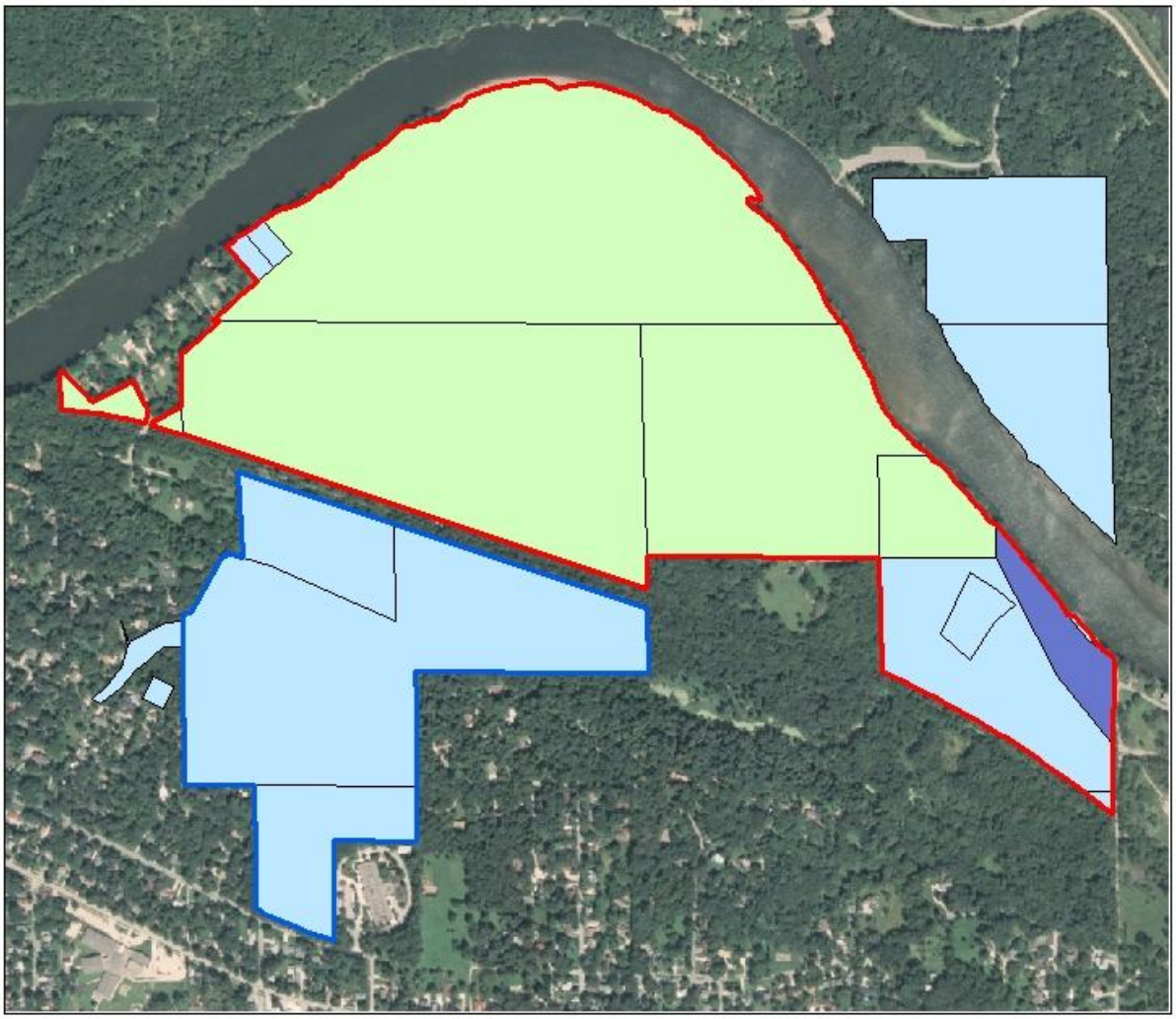
- Hartman Bluff State Preserve
- Hartman Reserve Upland Forest
- Hartman Reserve Lowland Forest

0 75 150 300 450 600 Meters

N

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

Hartman Deedholders



Legend

- North Unit
- South Unit

Hartman Deedholders

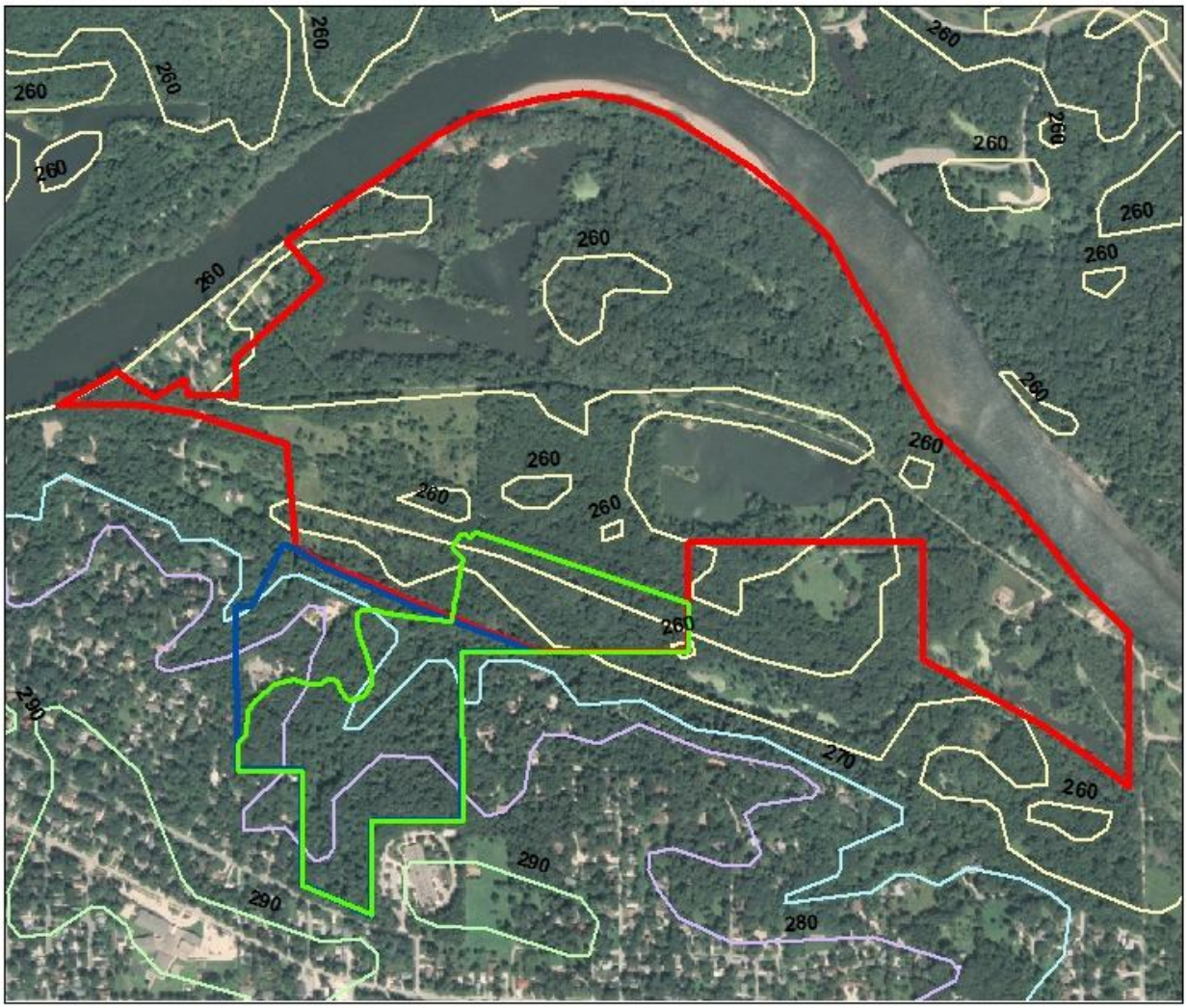
- Black Hawk County Conservation Board
- Manatts Inc.
- Waterhawks Water Ski Club Inc.

N

0 100 200 400 600 800 Meters

2009 Aerial Photo
Deedholder Data Obtained from BHCCB
Cartographer: Jameson Grier (2010)

Hartman Reserve Topographic Map



Legend

HBSP	**Topography**
Upland Forest	260 m
Lowland Forest	270 m
	280 m
	290 m

0 80 160 320 480 640
Meters

N

2009 Aerial Photo
Topography Data Obtained from BHCCB
Cartographer: Jameson Grier (2010)

II) PHYSICAL CHARACTERISTICS

A) Geomorphic setting

Hartman Reserve Nature Center consists of two geomorphic settings. The upland area represents a maturely-dissected glacial plain. This area is underlain by glacial till deposited during the Pre-Illinoian glacial period, the earliest glaciation in Iowa. The glacial deposits in the area are covered by a relatively thin (usually less than 1 m) blanket of loamy sediment, mostly derived from wind-blown sediments. The lowland area represents a part of the ancient floodplain of the Cedar River, and is underlain by stream deposited sands and gravels. Portions of the floodplain experience flooding on an annual basis, and during severe floods the entire floodplain is inundated. These geomorphic settings are located on the Iowan Surface Landform Region. This large landform region is sandwiched between the Wisconsin Surface in north central Iowa, and the Paleozoic Plateau in northeast Iowa. It is a varied region ranging from intensive agriculture to rich woodland, and from prairie to bog. This geologically complex region serves as a transition zone between the deciduous woodland to the tall grass prairie. The Cedar River flows through much of the region.

1) Soils

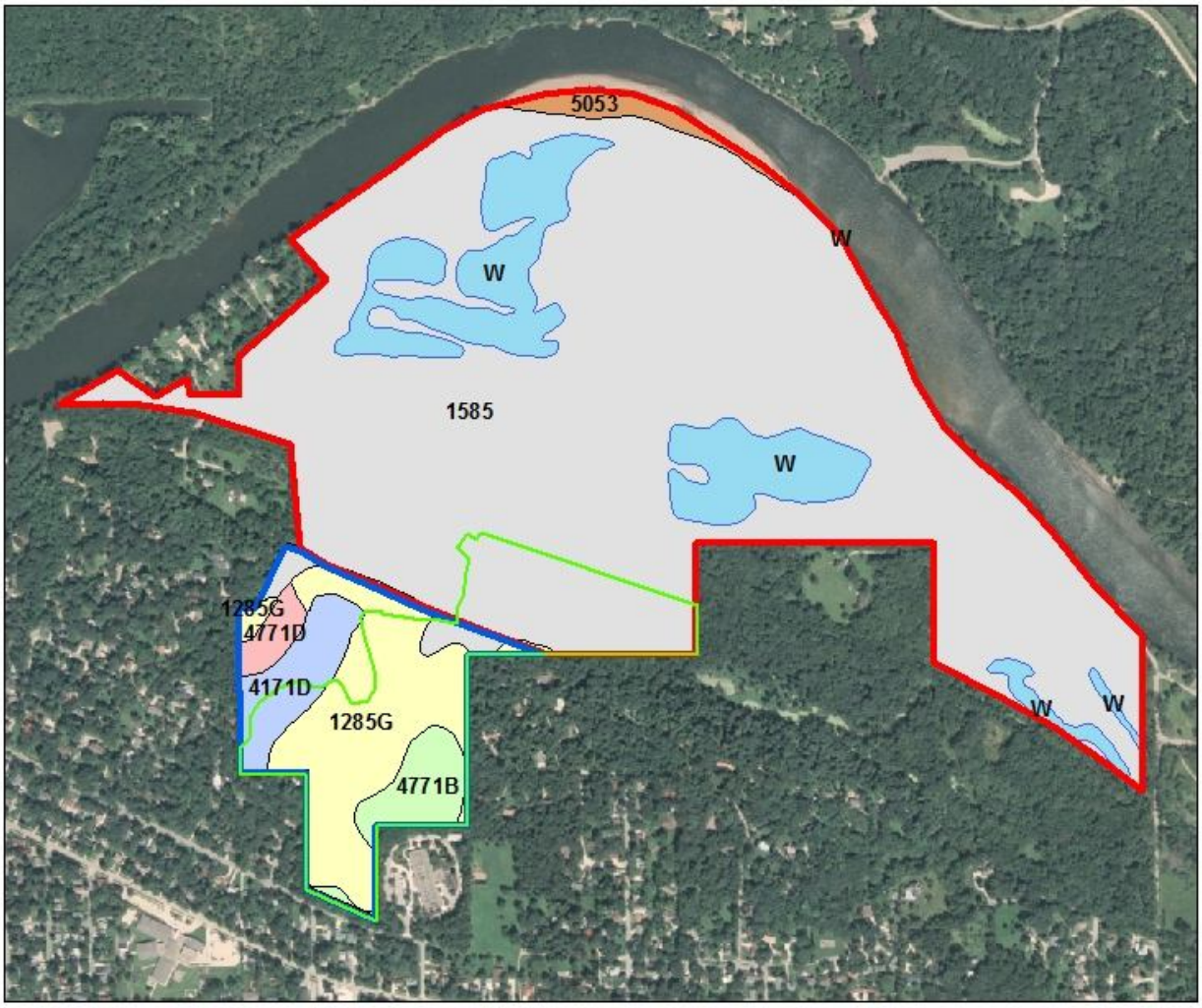
The soils of HRNC are quite varied because of the different geological origins of the substrates from which they are derived. Likewise, the contribution of the vegetation to soil building is significantly different. The soils of the lowland floodplain are primarily composed of sand, and have been texturally classified as loamy sand. Because they can be locally quite variable they have been placed in the Loamy Alluvial Land soil series. The combination of periodic flooding, high water table (1-4 ft.), and soil characteristics, creates limitations for trail construction and other public uses of land.

The upland soils belong to two major soil series and are derived from local alluvium on glacial till. The Clyde soils series texturally ranges from silty clay loam to sandy loam. These soils exhibit severe limitations for use in areas where there is poor drainage and the soil remains wet, soft, and slippery for long periods of time.

The remaining bluff soils belong to the Bassett soil series which are derived from glacial till. These soils are texturally classified as loam to heavy loam and may possess perched water tables (1 1/2-2 ft.) during extended moisture periods. These soils have slight limitations for use in areas where there is poor drainage and the soil remains wet, soft, and slippery for short periods of time.

Both upland soil series vary greatly in depth and their stability is significantly determined by steepness of the slope and relative abundance of ground cover. Considerable concern must be given to the maintenance and location of trails, especially as they relate to slope and drainage.

Hartman Soils Map



Legend

- Hartman Bluff State Preserve
- Upland Forest
- Lowland Forest

Soil Types

- Bassett-Urban Land Complex, 5-14% Slopes
- Burkhardt-Bassett-Chelsea Complex, 18-60% Slopes
- Psammaquents, Frequently Flooded
- Spillville-Coland, Channeled-Aquolls, Ponded Complex, 0-2% Slopes
- Water
- Waubeek-Urban Land Complex, 2-5% Slopes
- Waubeek-Urban Land Complex, 5-14% Slopes

N

0 90 180 360 540 720
Meters

2009 Aerial Photo
Soil Data Obtained from BHCCB
Cartographer: Jameson Grier (2010)

III) BIOLOGICAL CHARACTERISTICS

A) Botanical Considerations

The bluff and ravine system, with their respective soil substrates, provide an extremely varied exposure and slope gradient. The variety of growing conditions that this landscape creates results in a great diversity of flora. Human activity has also played a significant role in the diversity of flora through altering the landscape and introducing species.

An initial annotated list of the vascular plants known to occur in HRNC was compiled in 1975 and 2006, and is presented in Appendix 2.1. These lists illustrate a diverse range of the species and distributions along the bluff system.

According to the 1975 study (Appendix1.2), a total of 55 families, 109 genera, and 138 species are cited. The upland forest on the upper portion of the bluff, and the ravine system together support a total of 94 species; the remaining 44 species are primarily confined to the lowland area along the base of the bluff. A survey conducted in 2002 (Appendix 1.3) found an additional 15 species, bringing the total number of known species to 153.

In the 2006 survey (Appendix 1.4), a total of 451 vascular plant taxa representing 83 families were reported. Within this total, three distinct vegetation categories are identified. 1) Vegetation native to Iowa and occurring naturally in HRNC account for 331 of 451 taxa (74%). 2) A total of 33 plant taxa (7%) are native to North America (30 of 33 are native to Iowa) but apparently do not occur naturally in HRNC. 3) An additional 87 plant taxa, originating from the old world, are non-native/exotic and account for 19% of the total. A large majority of the latter category has become naturalized and is part of the HRNC flora. However, a small number of planted ornamental trees and shrubs recorded on the checklist do not appear to have spread from their point of origin. The 2006 survey added a total of 37 native Iowa plant taxa naturally occurring within HRNC which were previously unrecorded for Black Hawk County (Van Norman, 1987). A complete species list is found in Appendix 2.1.

1) Upland Forest

The upland deciduous hardwood forest occupies the bluff and plain to the south. Based upon studies conducted in the forest to the north and northwest of River Hills School (approximately a six acre area), the dominant trees are basswood (Tilia americana), ironwood (Ostrya virginiana), shagbark hickory (Carya ovata), and sugar maple (Acer saccharum) respectively. Occurring less frequently are red oak (Quercus borealis), white ash (Frazinus americana), and white oak (Quercus alba). By far the largest trees, and probably the oldest, are the two species of oak, red oak (Quercus borealis), and white oak (Quercus alba).

The dynamics of the upland forest is a challenging ecological puzzle and many of the informational pieces can only be conjectured without further study. Hartman Reserve Nature Center possesses populations representing remnants of two major upland forest types: open, xeric, oak-hickory forest climax type and closed, mesic, maple-basswood forest climax type. The location of HRNC on the junction of a plain and bluff with extensive ravine erosion, promotes intensive interdigitation of the soils; thus yielding an opportunity for the vegetation to become interdigitated as well. In such a situation any natural or unnatural influence will promote the shift of balance from one forest climax type to the other.

The largest size class of trees in the sampled area of the upland forest were oaks and basswood. However, sugar maples have produced a flux of individuals. The lack of shagbark hickory individuals in the largest size class is not clearly understood as its stature should permit inclusion. The explanation may be couched in terms of historical tradition when linked with other forest characteristics.

It was common during the late 19th century, before the rise of coal as a fuel, to selectively cut the riverside forests and adjacent upland forests for firewood and timber. Since hickory was highly favored for use in farm implements, furniture, building material, and firewood, it can be postulated that the large-size class percentages would be depressed in contrast to the less desirable hard oaks. Their cutting subsequently opened the canopy and promoted the increase of ironwood, a very slow growing sub-canopy species. Since the ironwoods became established in great densities, with the still over towering oaks and occasional basswood, the canopy eventually became more closed than the original oak-hickory forest canopy.

With the advent of coal use and the closed canopy conditions, the forest has been shifting in recent years to a more mesic forest with sugar maple reproduction surpassing all other species. The evidence should not be misconstrued to the conclusion that the forest is an extremely unstable habitat; the numerous spring ephemerals and ferns indicate a long history of presence and stability. The dynamics of the sampled area would indicate that during the last 20-25 years some significant forces have been influential in determining germination and seedling growth success of sugar maple. It should be emphasized that the dominance of trees can differ from one topographic site to another, but additional data is not available.

Although the upland forest is itself unique for the Waterloo/Cedar Falls metropolitan area and Black Hawk County, several habitats within the forest deserve special mention. One habitat worthy of special note is a northerly slope of the ravine system which supports the only county location of the uncommon mycotroph Indian pipe (Monotropa uniflora). Other ravines and their associated seepages support additional unusual-to-uncommon herbs such as the showy orchis (Orchis spectabilis), wild oats (Uvularia sessilifolia), rattlesnake root (Prenanthes alba), ginseng (Panax quinquefolius) and the vine, wild honeysuckle (Lonicera dioica). These and other habitats support the numerous spring ephemerals such as Dutchman's breeches (Dicentra

cucullaria), bloodroot (Sanguinaria canadensis), springbeauty (Claytonia virginica), wood anemone (Anemone quinquefolia), liver leaf (Hepatica acutiloba), louse wort (Pedicularis canadensis), Jack-in-the-pulpit (Arisaema triphyllum), bellwort (Uvularia grandiflora) and many others that provide a spectacular spring display before the tree canopy produces foliage. The forest also provides suitable sites for supporting an unusual tree for this region, black ash (Fraxinus nigra).

On September 26, 2002 (Appendix 1.3), a state botanist conducted a sampling of the undergrowth in the proposed Hartman Bluff State Preserve (HBSP). One hundred 1 square-meter plots were established within the upland and lowland areas of HBSP, and all plant species present within the plots were recorded. A total of 55 species were detected in the study. No exotic species were encountered in the plots. The floristic quality index (FQI) was calculated based on these plots and was determined to be 35.4. This score places the surveyed area in to the category of 35 or more which is said to be of "profound importance from a regional perspective" (Wilhelm and Masters 2000). Although, that statement is extraordinary enough for the surveyed area, it is important to note that this surveyed area represented only a small fraction of HRNC and therefore a fraction of the total expected flora. Simply put, the species composition and structure of the undergrowth plant community in the upland and bottomland habitats in the HBSP are typical of undisturbed, natural conditions.

2) Lowland Forest

The lowland or floodplain area is primarily dominated by lowland forest species: boxelder (Acer negundo), honey locust (Gleditsia triancanthos), American elm (Ulmus americana), hawthorne (Crataegus punctata), and Kentucky coffeetree (Gymnocladus dioica) with willow (Salix spp.) and cottonwood (Populus deltoides) occurring primarily around the artificial ponds. Cork elm (Ulmus thomasi) and black walnut (Juglans nigra) are less abundant. Because of the highly disturbed nature of the lowland area, the forest is more open. Much of the disturbance can be attributed to the death of many American elms (Ulmus americana) during the peak of the Dutch elm disease. This greatly opened the forest canopy and allowed for greater herbaceous and shrub establishment, along with earlier successional lowland forest species such as boxelder and honey locust. In 2008, butternut trees became infected with blight killing many of the trees. As of 2010, it is likely that only one individual is still producing foliage.

Several unusual habitats exist within the lowland forest area. Of chief interest are small elevated ridges along the eastern end of the area that support isolated stands of sugar maple and black walnut. Factors accounting for this distribution are poorly understood.

A second habitat of interest is the area at the base of the bluff where the runoff from the ravine system fans out onto the lowland area. The railroad tracks serve as a barricade to the natural drainage flow, which has resulted in a drainage system that runs parallel to the tracks. In this system, an ecotonal-hybrid vegetation is supported. An investigation of this area has not been conducted to effectively understand this unique situation.

Other habitats of special note in the lowland forest are those that support the unusual to uncommon forb: New England aster (Aster nova-angliae), and the shrub: nine-bark (Physocarpus opulifolius).

B) Zoological Considerations

The fauna of HRNC is quite diverse, primarily because of the diverse vegetation which creates diverse habitats. One difficulty in establishing the diversity of the fauna is their seasonality of use and mobility. No formal checklist of animals for HRNC exists, but the vertebrates of the general region are quite well known so that some reasonable assumptions can be made.

1) Invertebrates

The extent of invertebrate diversity at HRNC is virtually unknown. In general, this taxon is quite diverse and serves many important roles. For example, many assist in decomposition/mineral cycling and are essential initial components of food chains.

2) Fish

The few shallow ponds and intermittent streams of HRNC have been known to hold fish. However, these areas are subject to annual drying and freezing; so stable, permanent populations of fish do not exist.

3) Amphibians & Reptiles

Appendix 2.2 lists amphibian and reptile species that have been sighted at HRNC or are known to occur in nearby areas. The list is undoubtedly incomplete and a thorough investigation should be conducted. The existence of some species is greatly dependent upon water conditions in the shallow ponds in the lowland forest region.

One amphibian that merits special consideration is the blue-spotted salamander (Ambystoma laterale) which is listed as endangered in Iowa. After three years of monitoring, it has not been found at HRNC, but it does occur across the Cedar River in George Wyth State Park. As of 2010, a project has been initiated to introduce blue-spotted salamanders to HRNC.

4) Birds

The avifauna of HRNC is quite extensive but unfortunately not accurately catalogued. Appendix 2.3 lists species sighted in HRNC and in the surrounding neighborhood. It is quite certain that the list is incomplete as the state has an avifauna of some 360 species. Because there is no standardized program, avifauna nesting, rearing young, seasonal residency, etc. within HRNC cannot be explicitly delineated. However, it is noteworthy to mention that wood ducks and barred owls are among those species known to nest in HRNC. The pileated woodpecker is commonly seen and likely nests at HRNC. In the spring, it is possible to see seven species of woodpeckers at HRNC.

The Iowa Audubon recognized HRNC as an Important Bird Area (IBA) in 2004. HRNC was dedicated as an IBA because it is home to at least three species of high conservation priority: red-shouldered hawk, pileated woodpecker, and white-eyed vireo.

To release osprey into the Cedar River Valley, the Valley Park Hacking Tower was constructed in the north unit in 1998. The first four birds arrived in July of 1998 and fledged in August of 1998. From 1998 to 2005, a total of 30 birds fledged. In 2005, a pair returned to the north unit of HRNC to build a nest. In 2006, a pair was observed nesting at the intersection of highway 218 and highway 57 atop a communication tower. In 2009, three pairs had nested in Black Hawk County. More details on the Cedar Valley Osprey Program have been included in Appendix 8.

5) Mammals

A list of HRNC mammals is presented in Appendix 2.4. The mobility of this taxon results in many of the species being found in both types of forest. The larger mammals often enter HRNC from the north as they move from and along the river through the lowland forest which serves as a corridor to and from the river. The upland forest supports the red squirrel (Tamiasciurus hudsonicus) which is near its southern-most limit of distribution. In April 1998, six otters were released in HRNC and another six in George Wyth State Park.

IV) MANAGEMENT PLAN

The Black Hawk County Conservation Board (BHCCB) strives to preserve and protect the unique resources of Hartman Reserve Nature Center (HRNC) while fulfilling its mission to offer educational and recreational experiences. To ensure a high quality and useful management plan is maintained, BHCCB and will draw upon the financial resources and expertise of our community. These resources include funding from the Friends of HRNC and the expertise of the faculty of the University of Northern Iowa, Hawkeye Community College, Wartburg College, Iowa Department of Natural Resources biologists, and Iowa State Preserves Advisory Board. Additional help will be solicited from other local, state and national organizations, and other agencies as needed. Criteria for the resource management plan can be found in Appendix 3.

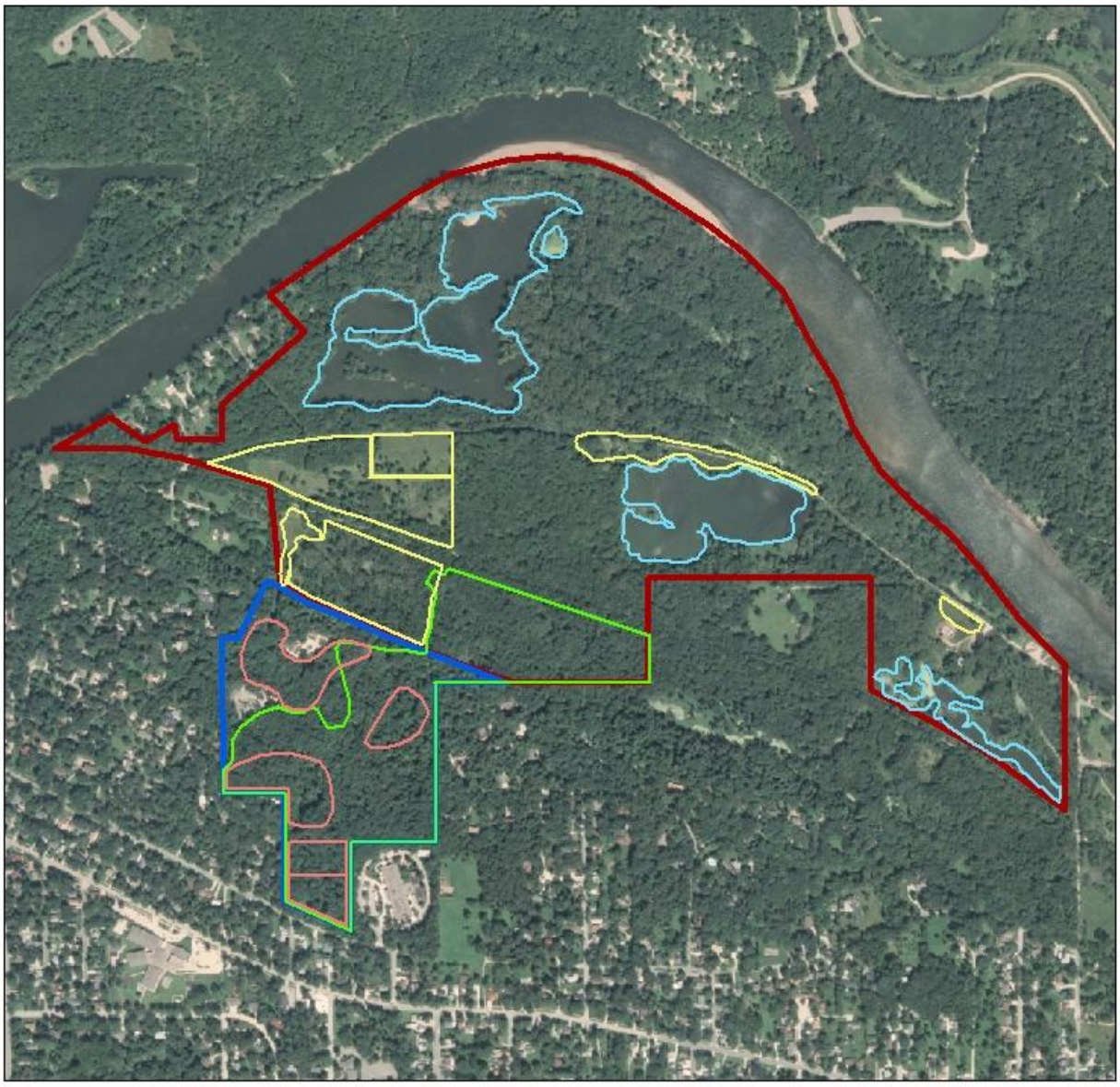
This plan is to be viewed as flexible guidelines that are allowed to evolve as knowledge of resource management techniques and management goals progress. It will be reviewed annually, highlighting new top priority tasks and ensuring monitoring data has been adequately recorded. A full revision will be made every five years.

A) General Management

Tasks listed below will be applied throughout HRNC. Site specific management plans are included later in the management plan.

1. Manage the habitat to maintain a diversity of native plants and animals.
2. Survey and monitor the flora and fauna to determine species composition and trends. Species lists can be found in Appendix 2.
3. Control invasive species by training staff, recruiting & training volunteers and scheduling service learning opportunities for volunteers. Volunteer guidelines can be found in Section IV.H. A list of invasive species and removal procedures can be found in Appendix 4.
4. Manage the forest to maintain examples of a maple-basswood complex, regenerate oaks and reestablish open oak woods.
5. Control herbivore populations to maintain native biodiversity. Deer management decisions will take into consideration the recommendations of the Black Hawk County Deer Task Force (Appendix 7).
6. Maintain a trail system and physical facilities by conducting semiannual inspections and making repairs as needed. See Section IV.F.3.
7. Control the size of groups and concentrate activities in the active use areas. Organized groups should be limited to 180 people.
8. Provide equal access by maintaining paved trails to the Interpretive Center, Gene & Betty Buckles Program Center, Tree House Deck, and Friends Shelter.
9. Restrict the use of bikes, horses and motorized vehicles. Mountain bike riding is only allowed on hiking trails north of Cedar Valley Bike Trail.
10. Provide access for educational & research projects.
11. Consult an archaeologist before any ground breaking begins to ensure sites of cultural significance aren't disturbed. Refer to Section IV.G.1.
12. Manage stormwater runoff by working with city, neighbors, and other willing stakeholders. Refer to Section IV.C.4.
13. Maintain a minimum of 80% natural areas and a maximum of 20% developed areas.
14. Review and update the plan annually, and revise the plan every five years.

Hartman Reserve Management Zones



B) Top Priority Management

1) Short Term

These tasks should be accomplished this year (2010) and updated yearly:

- Develop a forest stand map and incorporate it into the management plan.
- Develop site-specific burn plans and incorporate them into the management plan.
- Cut and drop downed trees into the ravine system to cheaply and quickly aid in stormwater management.
- Invasive species control
  - Focus on leafy spurge located around Shirey Prairie and the Interpretive Center (refer to Appendix 4 for suggestions).
- Update the status of mapped flora of special interest. Refer to Section IV.E.1.
- Map the unmapped flora of special interest. Refer to unmapped Flora of special interest Section IV. E.1.
- Determine the status of the sedge meadow. Refer to Section IV.D.2.g.
- Determine the location of a "green space" active use area for educational activities, which is covered with grass and located close to the Interpretive Center.

2) Long Term

These tasks are ongoing:

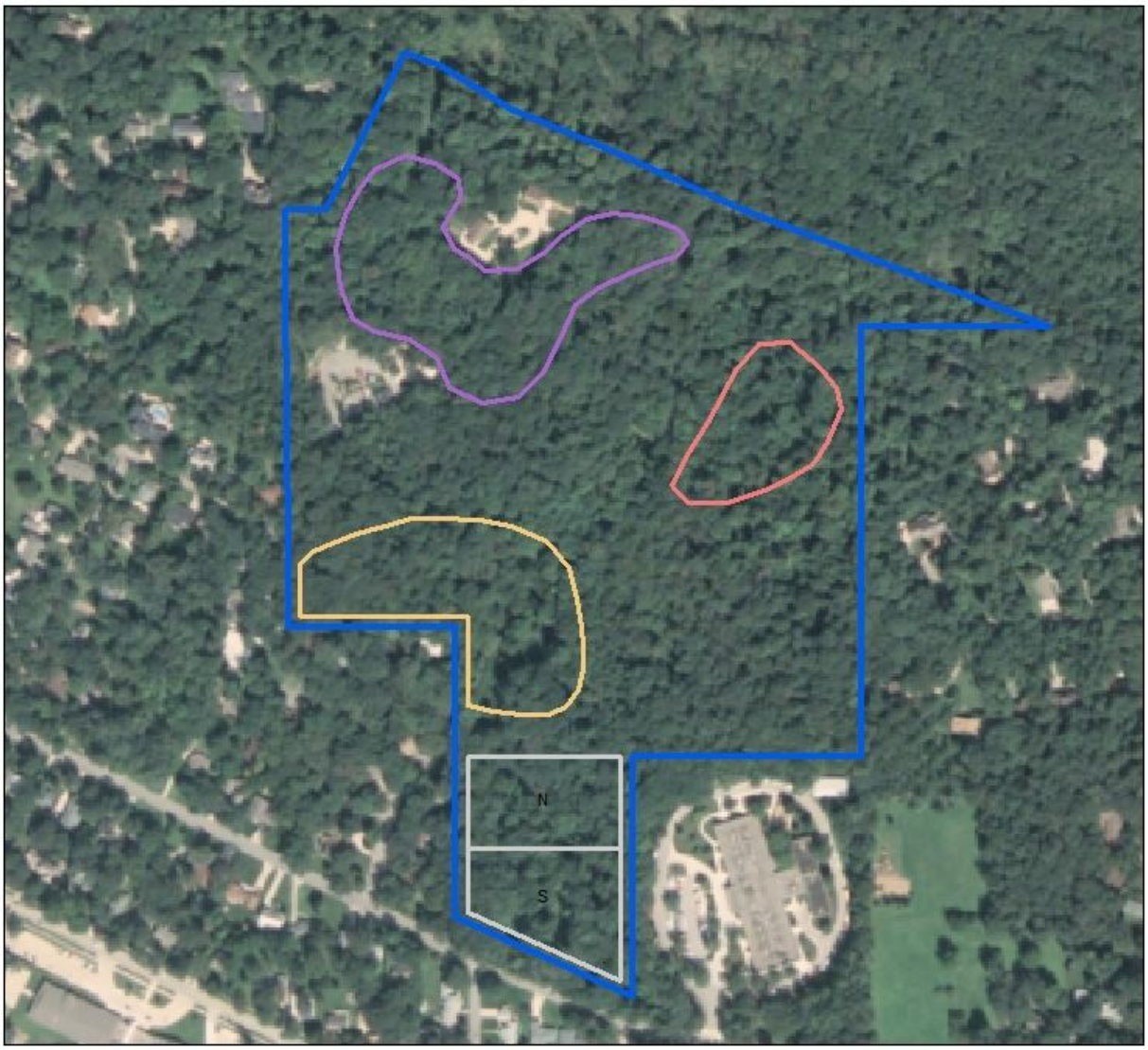
- Look for opportunities for land acquisition through easements, donations, and purchases to create buffers around HRNC.
- Continue to initiate stormwater management activities. Refer to Section IV.C.4.
- Continue to initiate the blue-spotted salamander introduction. Refer to Section E.2.f.
- Initiate the reconstruction of the nursery to a native landscape. Refer to Section D.2.c.
- Reintroduce/ propagate glade mallow. Refer to Section E.1.d.
- Develop species lists for invertebrates and fish occurring within HRNC.

C) Upland Forest

There are 39 acres of upland forest in HRNC. It surrounds the majority of the active use areas and holds most of the unique habitats. Two areas have been selectively cut to encourage the regeneration of red oaks. The third area has been selectively cut and burned to regenerate white oaks. A stand of sugar maple trees also surrounds the Interpretive Center, which serves as an education resource for tapping maple trees for maple syrup. The upland forest also contains sites of prehistoric archaeological importance.

Within HRNC lies Hartman Bluff State Preserve (HBSP). The eastern half of the upland forest is within the HBSP boundary. Due to the state preserve status, it adheres to additional regulations determined by the Iowa State Preserves Advisory Board. Regulations restrict major construction projects or environmental changes without prior approval from the Iowa State Preserves Advisory Board. Special management zones within HBSP include: White Oak Stand, Red Oak Stand I and II, gullies, and archaeological sites. Additional HBSP information can be found in Part 2.

Forest Management Zones



Legend

Upland Forest

Forest

Red Oak I (2 acres)

Red Oak II (4 acres)

White Oak (3.4 acres)

Sugarbush (4.8 acres)

0 30 60 120 180 240 Meters

N

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

1) White Oak Stand

- To regenerate white oaks in the uplands, controlled burns and selective cutting will be used in the 10 acre White Oak Stand near River Hills School. This zone is divided into a northern and southern zone by a stream that drains from the River Hills parking lot to the east. A timeline of management activities since 1999 can be found in Appendix 5. Work with the district forester to develop a stand map and management strategy to maintain optimal white oak savanna conditions. Refer to this strategy when completed.
- Continue to open the canopy and maintain a trajectory towards a white oak savanna by removing unwanted tree species such as maples, ashes, basswoods, box elder, mulberry, elm, honey locust, ironwood, honeysuckle, and buckthorn.
- Develop a scheduled burn plan for the area. Burns ought to be conducted every 1-2 years alternating between north and south zones. Refer to this burn plan when completed.
- Use staff and volunteers to encourage white oak regeneration by scattering acorns, caging small trees, planting seedlings, and removing invasive species.
- Continue to monitor and record work performed at the site in Appendix 13.

2) Red Oak Stand I & II

To regenerate red oaks in the uplands, the plan calls for selective cutting in two separate areas: Red Oak I and Red Oak II. Red Oak I is 0.6 acre site that is located south of the Mary Kay Eakin Bridge. Red Oak II is a 1.3 acre site located south of Kay Romanin Bridge. A timeline of management activities since 1999 can be found in Appendix 5.

- Work with the district forester to develop a stand map and management strategy to maintain optimal red oak savanna conditions. Refer to this strategy when completed.
- Continue to open the canopy and maintain a trajectory towards a red oak savanna by removing unwanted tree species such as maples, ashes, basswoods, box elder, mulberry, elm, honey locust, ironwood, honeysuckle, and buckthorn.
- Develop a scheduled burn plan for the area. Refer to this burn plan when completed.
- Use staff and volunteers to encourage white oak regeneration by scattering acorns, caging small trees, planting seedlings, and removing invasive species.
- Continue to monitor and record work performed at the site in Appendix 13.

3) Sugar Bush

A stand of sugar maple trees surrounds the Interpretive Center at HRNC. This stand should be maintained at its current size to provide valuable educational experiences for the public by demonstrating maple tree tapping for maple syrup, as well as a source of income for HRNC.

- Work with the district forester to develop a stand map and management strategy to maintain optimal sugar maple tree conditions. Refer to this strategy when completed.
- Use staff and volunteers to enhance the site by removing invasive species.
- Continue to monitor and record work performed at the site in Appendix 13.

4) Stormwater Management

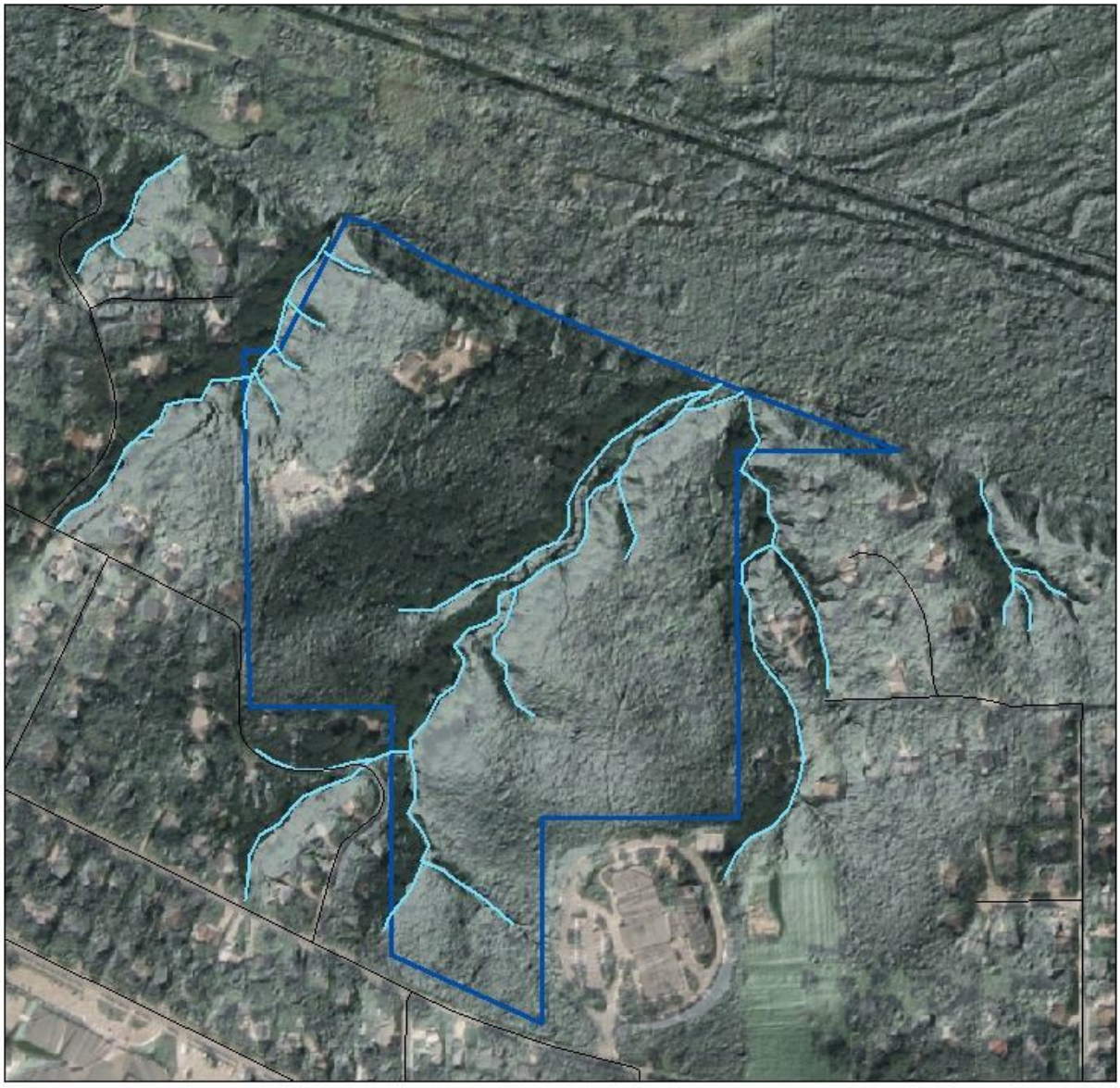
Intermittent streams would have been a natural occurrence through the HRNC bluff. However, due to increased stormwater runoff from residential areas and streets surrounding HRNC, there is now substantial erosion occurring throughout the bluffs. This causes environmental degradation through soil loss, pollution, and disrupting potential archaeological sites within the HRNC. Strategies for combating this problem would require HRNC and residential neighbors to install structures to reduce the amount and rate of stormwater flow. Such structures include: rain barrels, rain gardens, storm chambers, and permeable cement. HRNC has installed a rain garden in its parking lot, and is currently working with River Hills School to install a storm chamber in their parking lot.

There are a number of fallen trees across the ravine system which could be utilized for erosion control. Under ideal conditions these “dead falls” should be left in place as part of the natural cycle and wild aesthetic; however the potential value as erosion control may be more important. Portions of these downed trees could be cut and dropped into the ravine slowing the flow of water and forming small retention barriers for soil accumulation and as an aid for potential vegetation growth. Some seeding of specific plants which grow well in this environment, such as *Glyceria striata* (fowl manna grass) may help. Seed should come from native species found within HRNC (Appendix 1.4). Other construction or planting may be warranted, but

since there are restrictions on these activities within HBSP, these methods could be tested in the gullies that lie outside HBSP and monitored for effectiveness. If deemed effective they could then be proposed for use in HBSP.

- Identify key areas of concern.
- Cut and drop downed trees into the ravine system to cheaply and quickly aid in stormwater management.
- Design treatments that fit the landscape.
- Continue to work with neighbors surrounding HRNC to educate and encourage them to implement stormwater reduction methods (rain barrels, rain gardens, storm chambers, and permeable cement).
- Research solutions to implement within ravines to reduce erosion.
- Continue to look for donors like the Community Foundation of Northeast Iowa to contribute to stormwater management efforts.

Stormwater Management



Legend

- Roads
- Gullies
- Upland Forest

0 40 80 160 240 320 Meters

N

2009 Aerial Photo
Interpreted from Hillshade Map
Cartographer: Jameson Grier (2010)

D) Lowland

The lowland portion of HRNC is approximately 262 acres consisting of lowland/floodplain forest, oak savannas, prairies, lakes, and shallow water pools. A portion of the lowland forest also exists within HBSP.

1) Lowland/Floodplain Forest

The lowland forest exists throughout the lowland portion HRNC. This area is subject to annual flooding and is an important resting area for a variety of migrating birds. It has been a nesting site for red-shouldered hawks since 1994.

- Work with the district forester to develop a stand map and management strategy to maintain optimal lowland forest conditions. Refer to this strategy when completed.
- Watch for signs of non-native and invasive species, which have a tendency to enter areas through flooding.
- Monitor species and record work performed Appendix 13.

2) Prairies/Savannas

General management plans for the prairie/savanna portions of HRNC include:

- Creating a burn plan for each site. Refer to the plan when completed.
- Removing invasive species.
- Monitoring and recording work performed in Appendix 13.

a) Gentian Prairie

The Gentian Prairie is located in the northwest corner of the south unit, under the power line between the bluff and the Cedar Valley Bike Trail. This is the only known prairie remnant at HRNC. It may have been farmed at one point, but to our knowledge was not planted. Thus, it appears that a limited number of prairie species may have re-colonized the site after it was disturbed. In the winter of 1999, the MidAmerican Energy Company cleared the area under the power line that cuts across the west lowland forest and the Gentian Prairie. To maintain the utility corridor it was decided to expand the prairie and maintain the site with fire. A deck off of the Cedar Valley Bike Trail was constructed and interpretative signage installed. The Gentian Prairie is a part of Lucy's Meadow, a site that is being converted to an oak savanna. The area around the remnant portion has been seeded with native prairie plants. Management should continue to use fire, selective cutting and planting to restore the degraded prairie.

b) Lucy's Meadow

Lucy's Meadow lies in a transitional zone between Gentian Prairie and the lowland forest. In the past, it was heavily grazed and now contains an even-aged stand of Kentucky coffee and oak trees. In 1999 and 2000, "junk trees" including locust, elms, cottonwoods, box-elder, and hackberry where girdled to enhance oak growth. Swamp, bur, and white oaks have also been planted in the recent past (look in Appendix 5 for task history).

- Perform prescribed burns at Gentian Prairie and encourage the fire to continue into Lucy's meadow to maintain savanna conditions.
- Encourage oak growth by removing "junk trees," and plant selected oak species.

c) Former Nursery

The majority of the tree cover had been removed and the area was left as an open field in 1994. Volunteers planted over 500 oaks, walnuts and other hardwoods and established a bluebird trail. A one acre tallgrass prairie (Shirey Prairie) was seeded and is being maintained by fire.

- Perform management that maintains the oak savanna trajectory.
- Continue to manage smooth brome by spot-spraying smooth brome patches with herbicide and replanting with native grasses and forbs. To fill the niche that smooth brome held, seed in native cool-season species.
- After seeds are planted, mow the site for one to three years when the weedy species reach a height of 12-18 inches. Mow to a height of 4-6 inches (Packard and Mutel 2005).
- Maintain the prairie trail by mowing.

d) Shirey Prairie

Located in the center of the north unit, just south of Shirey Way and north of the Prairie Trail. This site was part of nursery that is being converted to an oak savanna. The area was treated with herbicides to manage the smooth brome and planted with native warm season grasses in the early 1990's. Additional forbs have been added by volunteers.

- Follow the general management plans for the prairie/savanna portions of HRNC.

e) Gateway Prairie

Located in the northeast corner of the lowland, at the trailhead for Shirey Way. The prairie was originally established around a house located on the site. The yard around the house was treated with herbicide and planted with a mix of native grasses and forbs using a grant from the State of Iowa's Resource Enhancement and Protection (REAP) program. In 2009, the house was torn down and native seeds were planted in its place with the help of Devonshire School students.

- A population of leafy spurge has been located east of the Shirey Way entrance and should be eliminated as soon as possible. Refer to Appendix 4 for control procedures.

f) Lake Manatt Prairie

Located under the power line, between the north shore of Lake Manatt and Shirey Way. To maintain the utility corridor, this narrow strip was seeded with a mix of prairie grasses and forbs after the trees were removed by the power company in the mid 1990's.

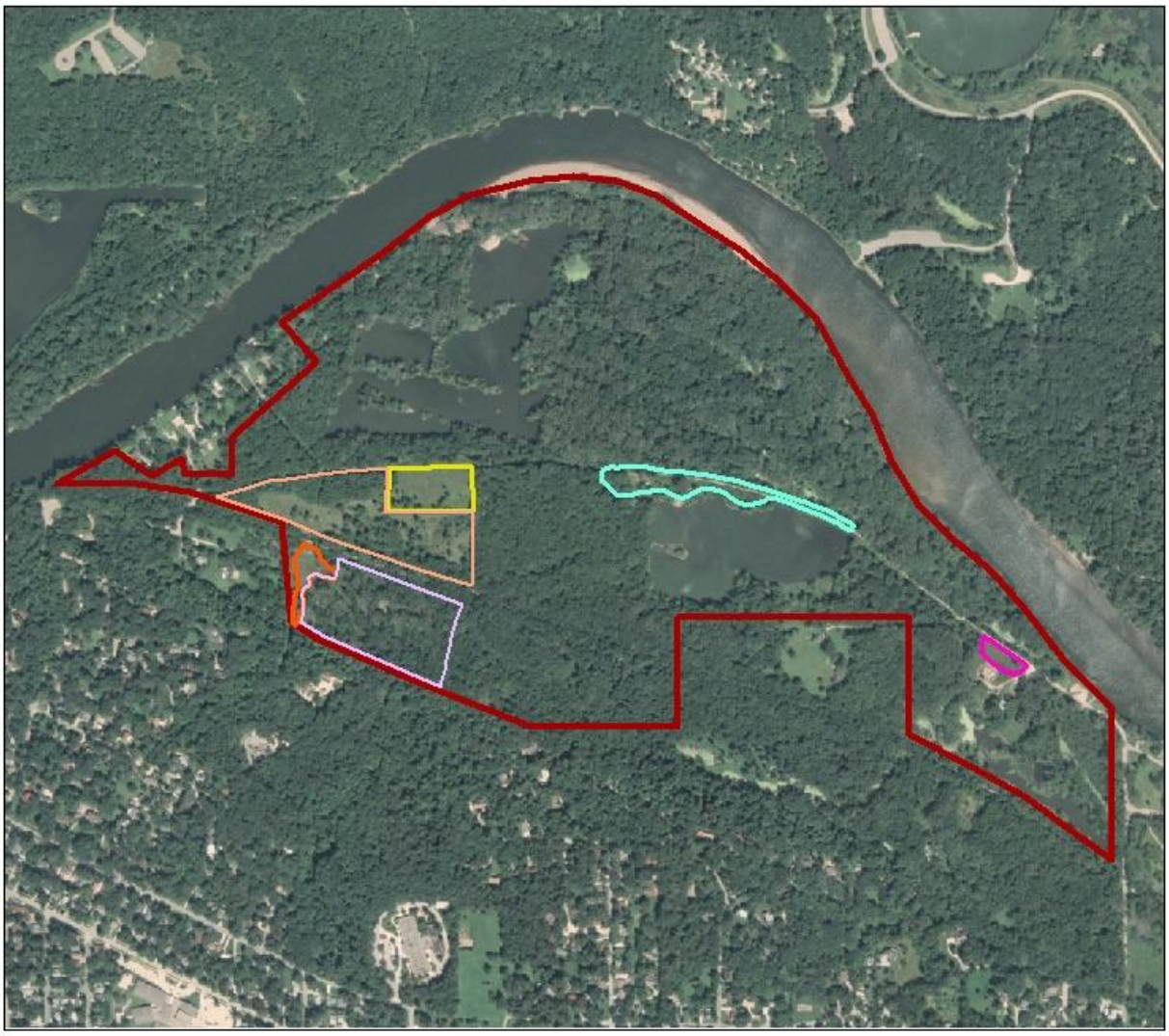
- Follow the general management plans for the prairie/savanna portions of HRNC.

g) Lake Manatt Sedge Meadow

This sedge meadow is located just south of Lake Manatt. This site is rapidly being colonized by sandbar willow (*Salix exigua* spp. *Interior).* Without management, including selective cutting and stump treatment with herbicide, this habitat will disappear due to the enclosing canopy. In addition, while fire was probably not a primary process in this portion of HRNC, it may be of use at least in the short term to set back the woody growth (Appendix 1.4).

- Follow the general management plans for the prairie/savanna portions of HRNC.

Prairie Management Zones



Legend

Lowland Forest

Prairies

- Lucy's Meadow (9.4 acres)
- Former Nursery - Savanna (10.6 acres)
- Shirey Prairie (2.9 acres)
- Lake Manatt Prairie (3.2 acres)
- Gentian Prairie (1 acre)
- Gateway Prairie (0.6 acres)

0 80 160 320 480 640 Meters

N

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

3) Lakes and ponds

a) Shirey Lake

This 25 acre body of water is directly linked to the Cedar River which floods seasonally. Largemouth bass were stocked in 1992 by the Iowa Department of Natural Resources. Wood duck houses and an osprey nesting platform have been installed by volunteers. The Valley Park Hacking Tower was built at its eastern edge in 1998. A total of 30 ospreys were released from 1998 to 2005.

- Establish a habitat management strategy with the district fishery biologist of the Iowa Department of Natural Resources.
- Enhance wildlife habitat by utilizing structures and techniques such as wood duck houses, osprey nesting platforms, and cover for fish (Christmas trees).

b) Lost Lake

This lake is within the Shirey Lake complex. Management should be consistent with Shirey Lake to maintain optimal wildlife habitat.

c) Lake Manatt

This 10 acre body of water is seasonally flooded by the Cedar River. Fish habitats have been placed in this lake. An osprey nesting platform was mounted on a tree and wood duck houses have been installed by volunteers. A canoe access and a shelter have been built on the northwest corner of the lake.

- Establish a habitat management strategy with the district fishery biologist of the Iowa Department of Natural Resources.
- Enhance wildlife habitat by utilizing structures and techniques such as wood duck houses, osprey nesting platforms, and cover for fish (Christmas trees).
- Establish and maintain a prairie habitat underneath the power line on the north shore of the lake prescribed fire and woody species removal.
- Use prescribed fire, woody species removal, and planting to restore degraded savanna habitats around the lake.

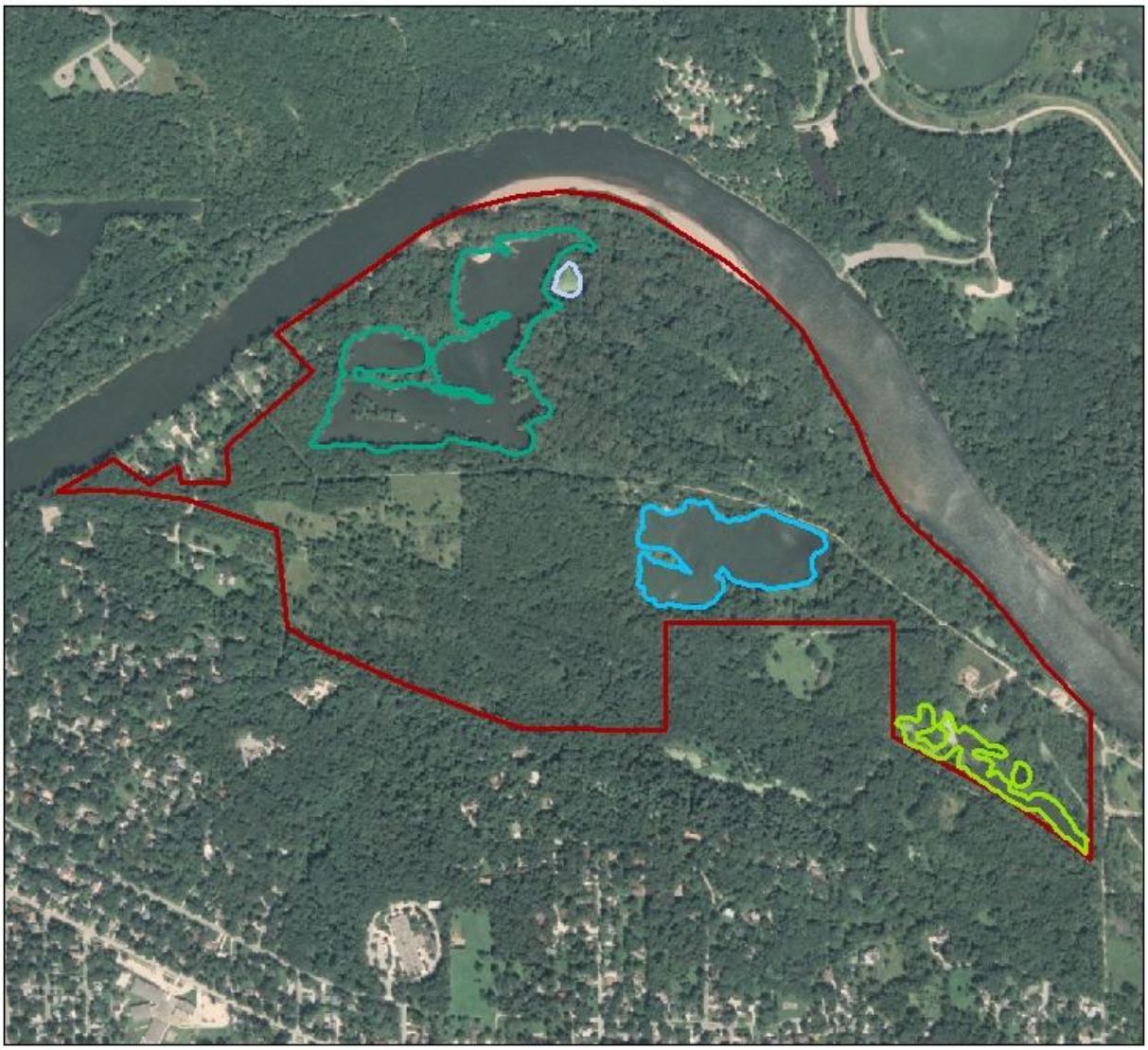
d) Bullfrog Bayou

Bullfrog Bayou is a wetland located along side the Cedar Valley Bike Trail. It provides wildlife habitat for fauna such as wood ducks, great blue herons, and turtles. There is a deck off the bike trail for wildlife viewing.

e) Vernal Pools

There are several vernal pools that exist throughout the HRNC lowland forest. These pools will temporarily hold water throughout the year. They provide excellent habitat for frogs, toads, salamanders, and turtles. Although temporary, they are an important habitat that supports some of HRNC's biodiversity.

Water Management Zones



Legend

- Lowland Forest

Water

- Lake Manatt (11 acres)
- Shirey Lake (24 acres)
- Lost Lake (0.5 acres)
- Bullfrog Bayou (3.7 acres)

0 85 170 340 510 680
Meters

N

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

E) Special Interest Species

1) Flora of special interest

Mapped Species

Efforts should be made to check on and update the status of these species on a yearly basis.

a) Assiniboia Sedge (upland)

The rare assiniboia sedge (*Carex assiniboinensis)* has been proposed for listing on Iowa's Threatened, Endangered, and Special Concern Plant List. It can be found in the herbaceous layer of the upland forest. A localized but very dense population of this species was observed near River Hills School. Evidently, part of the population occurs on school property and part is located on HRNC property HBSP. The density of the population is striking as this species is excluding most other herbaceous growth in the immediate vicinity where it occurs. While not observed elsewhere, certainly a small number of plants could be overlooked. At present, the area should simply be monitored and not significantly manipulated.

b) Beak Grass (upland)

Beak grass (*Diarrhena americana)* is a perennial found in deciduous forests with medium wet soils in part shade to full shade. It naturalizes by slender, creeping rhizomes and can form dense colonies in optimum growing conditions. Beak grass blooms in early August through early September; fruiting occurs early September through early October. It is an uncommon species for the area.

c) Lousewort (upland)

Lousewort *(Pedicularis canadensis)* is historically found in mesic to dry black soil prairies, open woodlands and sandy woodlands, savannas and sandy savannas, thickets, and borders of lakes. This plant is often associated with HRNC's oak woodlands and savannas. It is partially parasitic and gets nutrients from the roots of other plants. Lousewort flowers April to June.

d) Glade Mallow (lowland)

Glade mallow (*Napaea dioica)* was historically found along the South Riverside Trail, running between the north and south unit of HRNC. This plant is listed as a species of "special concern"on Iowa's Threatened, Endangered, and Special Concern Plant List and was considered for federal protection. The 2005 botanical survey stated no plants were currently found on HRNC property; though they were inches from the border. The survey recommended the introduction of a population of glade mallow into appropriate habitats to preserve the local population. Since the survey, 3-5 plants have been identified and mapped; though they are currently in jeopardy of local extinction. Glade mallow requires habitat that is moist, sheltered locations in lowland forest openings, with partial to full sunlight, riverbanks and perhaps some wetland habitats. This preference supports evidence that it was once found in our north unit, a forested floodplain area providing high soil moisture, shade, and shelter. Plans for increasing the population are included in the Threatened Species Restoration Project (Appendix 11). If this is attempted, state permission is required and the introduced plants should be monitored. Glade mallow blooms July through August.

- Attempt to increase the current glade mallow population through vegetation management.
- Remove woody vegetation from moist lowland areas and wetlands to open the canopy, allowing natural light to stimulate existing dormant seeds.
- Monitor the cleared area for a season to determine if any existing seeds will germinate.
- If there is little or no growth in the glade mallow population, harvest seeds from the existing HRNC plants and plant them in the treated area.
- Due to the plants "special concern" status, work directly affecting the current population must be approved by the Iowa State Preserves Advisory Board prior to treatment.
- Trained volunteers and staff should continue to monitor the population.

e) Green Dragon (Lowland)

According to the 2005 botanical survey, the green dragon (*Arisaema dracontium)* is considered to be a rare plant in Iowa. Although, it has never been officially documented in Black Hawk County. Through the Geographic Information System (GIS) monitoring program, a small, yet successful population was discovered and mapped in the east lowlands. In central Iowa, this species is at its western most range where it suffers from increased vulnerability due to encroachment. Its rare status and unique form make this species especially valuable as an educational tool and an important part of our native plant collection. The lowlands of HBSP provide the ideal moisture and light conditions for the green dragon. It is included in the Threatened Species Restoration Project (Appendix 11). It flowers May to June, and fruits late summer.

- Due to the green dragon's location in the HBSP, management to enhance the population of green dragon should be done in coordination with the Iowa State Preserves Advisory Board and other outside consultants.

f) Butternut (throughout)

The once strong butternut *(Juglans cinerea)* has been declining since the 1967 introduction of butternut canker. Although it is not federally listed as threatened, three states have listed it on their lists. This species has become very rare through much of its range in Iowa. During the botanical survey, Watson found only five trees on the entire HRNC property, of which some are currently showing signs of butternut canker. A few more plants have been discovered and mapped through the GIS monitoring program. All of the discovered trees are suffering from cankers. Butternut is a small stature tree that prefers well-lit areas, which makes it vulnerable to being shaded out by the larger maples and oaks. Butternut is included in the Threatened Species Restoration Project (Appendix 11).

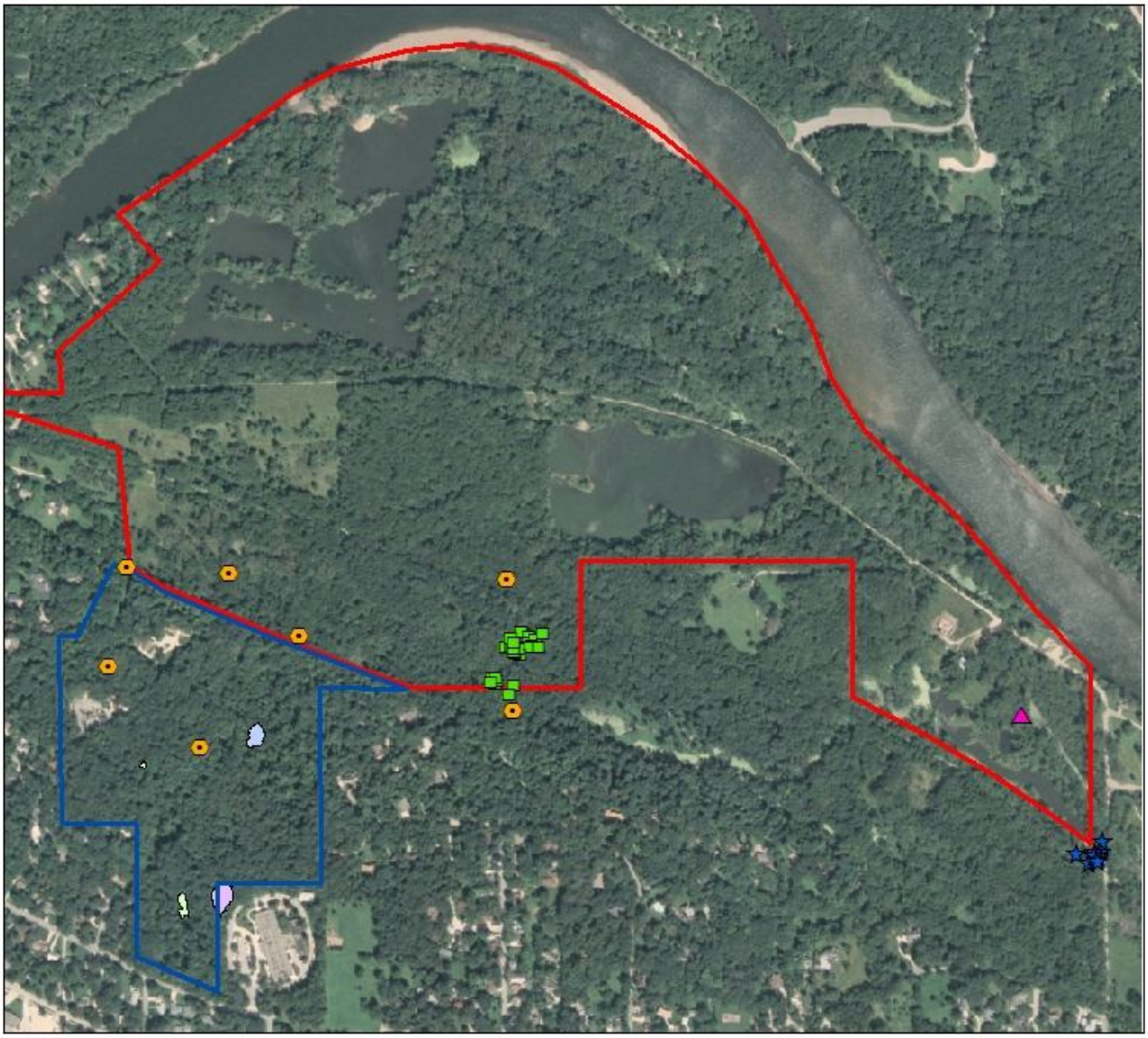
- To increase the population, fallen nuts can be collected and planted in the more open savanna areas.

g) Buttonbush (lowland)

Though the buttonbush (*Cephalanthus occidentalis)* is a common plant in Iowa, the small populations are at risk of local extinction.. This plant has been identified as an indicator species of wetland habitats. Three buttonbush plants have been found in the north unit wetlands, north of the Cedar Valley Bike Trail. The trail has prevented their spread to the wetlands on the south side of the trail. Continued monitoring of this plant is necessary. Should the population decrease, it will indicate a decrease in wetland health. Propagation of the plant may be necessary to protect its population. Propagation would entail removing seeds from existing plants to be placed at an alternative location, while protecting the existing populations. Buttonbush is included in the Threatened Species Restoration Project (Appendix 11). It blooms from June to August.

- Introduce buttonbush plants to the south side of Cedar Valley Bike Trail or other suitable HRNC habitats.

Hartman Plant Species of Interest



Legend

- Green Dragon (31 plants)
- Glade Mallow (14 plants)
- Buttonbush (2 plants)
- Butternut (7 plants)
- Upland Forest
- Lowland Forest

Plant Colonies

- Assiniboia Sedge
- Beak Grass
- Louse Wort

N

0 70 140 280 420 560 Meters

2009 Aerial Photo
GPS Data from BHCCB
Cartographer: Jameson Grier (2010)

Not Mapped

Attempts should be made to locate these species, use a global positioning system (GPS) to record their locations, and map them on geographic information systems (GIS) software. They should also be located on a yearly basis and have their status updated. Monitoring sheets can be found in Appendix 13.

h) Sessile-leaved bellwort (upland)

The rare sessile-leaved bellwort (*Uvularia sessilifolia)* occurs on the west facing slope of Red Oak II. This is the only location in HRNC where this species was observed and may prefer an open habitat (Appendix 1.4). Sessile-leaved bellwort flowers May to June.

i) Ravine species (upland) – Indian pipe, showy orchis, rattlesnake root, ginseng, wild honeysuckle

The only county location of the uncommon mycotroph Indian pipe (*Monotropa uniflora*) was last seen in the 1980's on the northerly slope of the ravine system. Indian pipe flowers from June to September.

Other portions of the ravine system support additional unusual to uncommon plants such as the showy orchis (*Orchis spectabilis*) which flowers May to June; limber honeysuckle (*Lonicera dioica*) which flowers May to June; ginseng (*Panax quinquefolius*) which flowers from June to October; and rattlesnake root (*Prenanthes alba*) which blooms August to September. (Appendix 1.2)

- When removing honeysuckle for management purposes, be aware of the differences between the native and invasive species. There are two native shrubs (*Diervilla lonicera* and *L. canadensis*), three native vines (*L. dioica*, *L. reticulate*, *L. sempervirens*), and the five invasives (*L. maackii, L. morrowii, L. japonica, L. tataritica,* and *L.* x *bella*). See Appendix 4.

j) Rock Elm (lowland)

Rock elm (*Ulmus thomasii*) is a rarely encountered tree in Iowa. It was reported in 1987, but it was not observed during the 2006 survey. To the uninitiated, this species looks like other elms and any prescribed tree cutting needs to take that into consideration. Further searches for this species may be warranted (Appendix 1.4).

- Locate and mark rock elms to prevent unintentional removal.

k) Muskingum Sedge (lowland)

Muskingum Sedge (*Carex muskingumensis)* is considered rare in the state. It has not previously been reported in Black Hawk County, but is frequently encountered in the lowland forest at HRNC (Appendix 1.4).

l) Woodland Bluegrass (lowland)

The lowlands contain a significant population of woodland bluegrass (*Poa sylvestris).* It is commonly found growing under the existing canopy. At this time, it is unknown what effect continued thinning of the canopy and attempts to convert the area to oak savanna may have on this rare species. Their habitat is moist woods with alluvium (Appendix 1.4).

m) Introduced - Nodding Wild Onion, Purple Cone Flower (lowland)

Nodding wild onion (*Allium cernuum),* which flowers late June to mid August, and purple coneflower (*Echinacea purpurea),* which flowers June to October,are not native to HRNC. Both were brought in with seed mixes or otherwise planted in Shirey Praire. The natural habitat for *E. purpurea* is open woodlands of southeast Iowa. It does not naturally occur this far north. *A. cernuum* is reported as rare in the Paleozoic Plateau. It is not known to occur naturally in Black Hawk County. It is likely that both of these species will eventually colonize the wooded habitats of HRNC if not removed. Vegetation originally native to HRNC can also be found in this planting and is in direct competition with the introduced species (Appendix 1.4).

- Monitor A. cernuum and E. purpurea populations to ensure they don't outcompete native vegetation.

2) Fauna of special interest

The Iowa Audubon recognized HRNC as an Important Bird Area (IBA) in 2004. Hartman Reserve Nature Center was dedicated as an IBA because it is home to at least three species of high conservation priority: the pileated woodpecker, red-shouldered hawk, and white-eyed vireo. Hartman Reserve Nature Center also has an urban deer hunting program, osprey reintroduction program, and is in the process of initiating a blue-spotted salamander reintroduction program.

a) Pileated Woodpecker

The pileated woodpecker regularly frequents the area and probably also nests at HRNC. It prefers bottomland forest habitat where it can find ants, wood-boring beetles, other insects, acorns, and berries to eat. It also prefers habitat which contains large dead trees to nest in. It is important to leave some dead trees standing for the use of pileated woodpecker and other fauna.

- Refrain from removing large dead trees

b) Red-shouldered hawk

The red-shouldered hawk is currently listed as endangered on Iowa's endangered, threatened and special concern animals list. They nest in large tracts of mature to old-growth woodlands; especially bottomland hardwoods, riparian areas, and flooded deciduous swamps. Their nests are made of large sticks in a fork of the main trunk of a dominant tree or where a primary branch meets the trunk. They feed along the wooded margins of marshes; often close to cultivated fields and natural openings. Their primary prey are small mammals, birds, amphibians, reptiles and invertebrates.

c) White-Eyed Vireo

The white-eyed vireo is a small migratory songbird that is uncommon to Iowa. They breed and nest at HRNC, which is at their northern most limits. They prefer low bushes and shrubs in abandoned cultivated fields or overgrown pastures. They are often found in bramble patches. When workers are removing invasive bramble patches, they should be aware of what the bird and their nests look like to avoid disturbing them. The grass-lined nest is a neat cup shape, attached to a fork in a tree branch by spider webs. During the breeding season, their diet consists almost exclusively of insects, primarily caterpillars.

- Refrain from removing bramble patches if a white-eyed vireo nest is present.

d) Cedar Valley Osprey Project

The Valley Park Hacking Tower was constructed in the north unit in 1998 to release osprey into the Cedar River Valley. The first four birds arrived in July of 1998 and fledged in August of 1998. From 1998 to 2005 a total of 30 birds were fledged. In 2005, a pair returned to the north unit of HRNC and started building a nest. In 2006, a pair was observed nesting at the intersection of highway 218 and highway 57 atop a communication tower. In 2009, three pair had nested in Black Hawk County. A summary of the Cedar Valley Osprey Program has been included in Appendix 9.

- Continue to monitor and document nesting locations.

e) Deer Management

In order to maintain healthy deer populations within HRNC, certified hunters can register for a special bow hunting permit within city limits. The management goal is to maintain a population of less than 30 deer/sq. mile. Supplemental information and results of the program can be found in Appendix 7.

f) Blue-Spotted Salamander

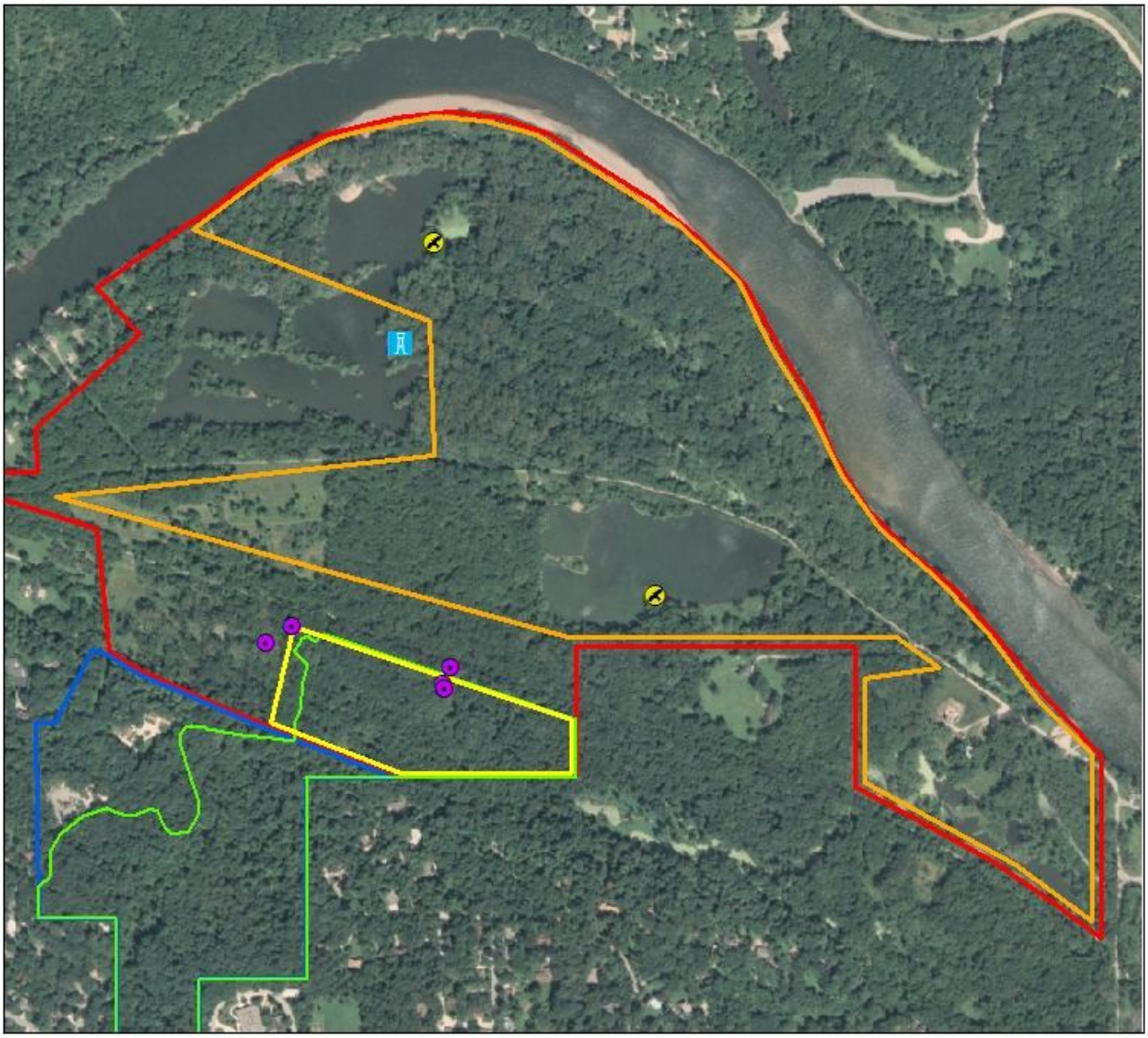
The blue-spotted salamander (*Ambystoma laterale*) is listed as endangered on the Iowa endangered, threatened and special concern animals list. Black Hawk County and Linn County contain theonly two known populations in Iowa. The blue-spotted population in Black Hawk County is in George Wyth State Park, which is located across the Cedar River from HRNC. As part of HRNC's Threatened Species Restoration Project (Appendix 11), plans are being made to release blue-spotted salamanders in the eastern section of the lowland forest of HBSP.

Blue-spotted salamanders will be collected from the George Wyth State Park population and transported to the Henry Doorly Zoo in Omaha, NE where a breeding program will be initiated. The tadpoles that result from this breeding program would be released at the five pool sites in HBSP that have been monitored for blue-spotted salamanders the last three years.

A work plan has been drafted and staff are working to obtain permits. Working with Iowa Department of Natural Resources, Omaha's Henry Doorly Zoo, and Natural Resources Conservation Service, an introduction is slated for 2011. See Appendix 10 for the work plan.

- The five release pool sites should continue to be protected and monitored by trained staff and volunteers prior to and following the release.

Hartman Wildlife Species of Interest



Legend

- Salamander Traps

Deer Hunting

- DMZ Zone C
- DMZ Zone C-1

Osprey

- Valley Park Hacking Tower
- Nest Platform

- Upland Forest
- Lowland Forest
- State Preserve

N

0 70 140 280 420 560
Meters

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

g) Red Squirrel

The red squirrel lives in dense pine forests or dense hardwood forests with a thick understory. It eats tree buds, leaves, flowers, fungi, acorns, bark, berries, hickory nuts, pine nuts, walnuts, insects, and the seeds of other trees. HRNC supports red squirrels which are near its southern-most limit of distribution. Its presence is an important reason for maintaining the area as an undeveloped and relatively undisturbed site.

h) Beaver

Beaver live in the lowland portion of HRNC in the lakes and near the river. They are currently of no concern, but due to few natural predators in the area, their populations and presence should be monitored to avoid unwanted disturbances to wooded areas. If they become a problem they may need to be trapped in order to control their numbers.

i) Mussels

Mussels are an important part of a river ecosystem, because they filter water that washes over them. They are sensitive to changes in water quality and serve as great indicators of a river's health. It is believed that of the 40 native species that historically inhabited the Cedar River, as few as 10 remain in the Cedar Falls/Waterloo area. One of the major factors thought to impact mussel populations is current land use practices that release heavy silt and sediment loads into the river, smothering mussel beds.

In 2006, HRNC began a mussel restoration project to enhance declining mussel populations in the Cedar River. Efforts for 2006-2007 showed promising results with over 400 plain pocketbook mussels raised. In 2008, floods disrupted reintroduction efforts. In 2009, due to unknown factors, no mussels were produced using the same methods as 2007.

Mussels offer valuable services as water filterers, water quality indicators, and sources of food for fish, birds, and mammals. The restoration project also provides educational opportunities for the public. For this reason the mussel restoration project should be reactivated. Details of the restoration project history and grant proposals can be found in Appendix 15.

- Continue to seek out donations, grants, partners, and volunteers to fund the mussel restoration project.
- Educate public on the significance of mussels.
- Couple the mussel restoration project with stormwater management since stormwater runoff affects mussel populations.

F) Active Use Areas

The identified active use areas are inspected semiannually. Maintenance takes place as staff and resources allow. Each area has been assigned a management strategy. Maintain a minimum of 80% natural areas and a maximum of 20% developed areas.

1) <u>Parking lots and roads</u>

a) Upland

The parking lot and road is a paved surface. Vegetation is trimmed back 2-3 feet from the edge of the lot each summer. Dead snags within 10 feet of the edge are identified and removed. The center of the parking lot will be maintained as a rain garden. Native forbs, grasses, and shrubs will be planted and allowed to mature. To reduce run-off, the paved surfaces should be made permeable if possible.

b) Lowland

The two parking lots at the east end of Shirey Way will be maintained to provide access to the boat ramp and Shirey Way. A trailhead sign has been placed at the entrance to the Shirey Way Trail. Shirey Way will be maintained as a trail/service road. The vegetation will be trimmed back 2-3 feet from the edge and all dead snags within 10 feet will be removed.

2) Amphitheater and Activity Sites

The vegetation will be trimmed back 2-3 feet from the edge and all dead snags within 10 feet will be removed.

3) Trails, Bridges and Decks

A trail assessment will be conducted on a yearly basis. Any trail structures (bridges, stairs, etc) in need of maintenance shall be noted and taken care of. If trails are causing significant erosion or other undesirable effects, efforts should be made to move them to redirect foot traffic. After significant flooding events or wind storms, trails should be checked to remove debris on or along them.

All upland trail surfaces will be wood chipped or graveled. Vegetation will be trimmed back 2-3 feet from the edge and all dead snags within 10 feet will be removed. Wet spots will be bridged and downed trees will be removed and a clear passage maintained.

a) Area 1

Trails located south of the Cedar Valley Bike Trail are top priority trails to maintain since they receive the most visitor traffic and contain the most structures. Efforts should be made to make regular assessments of this area to ensure high quality trails are maintained.

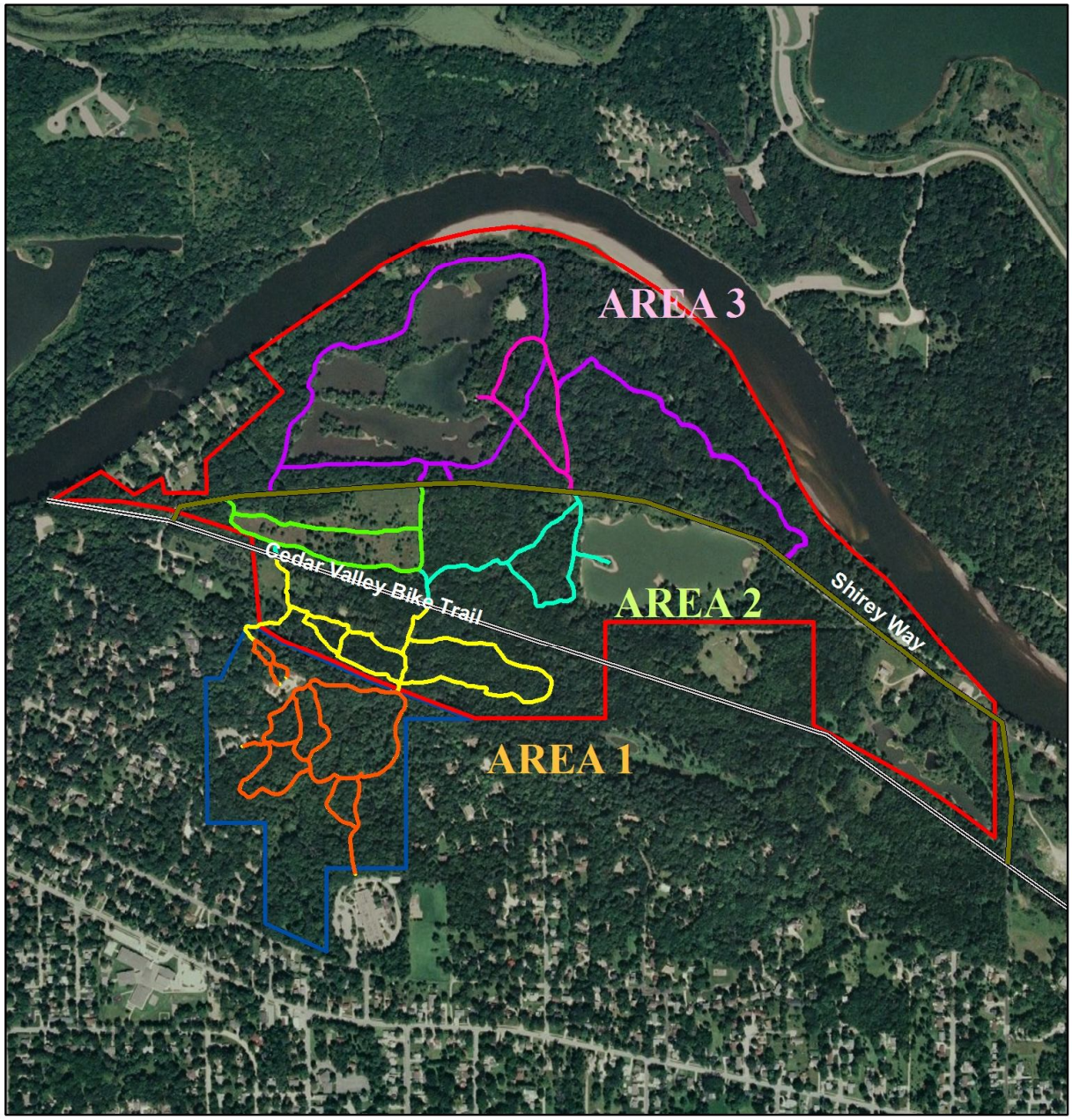
b) Area 2

Trails located between the Cedar Valley Bike Trail and Shirey Way are second priority trails. Trails located in the Former Nursery Prairie should be mowed regularly to maintain desirable hiking conditions for visitors.

c) Area 3

Trails located north of Shirey Way are least priority. The majority of these trails are mainly used and maintained by local mountain bikers. Efforts should be made to work with them to maintain optimal mountain biking conditions. The Hacking Tower Trail provides access to the osprey hacking tower and is part of the Cedar Valley Kayak Trail. It should be maintained to provide ease of access to the tower.

Hartman Reserve Trail Management



Legend

- Shirey Way
- Cedar Valley Bike Trail
- Upland Forest
- Lowland Forest
- Mowed Prairie
- Lowland Forest
- Hacking Tower Trail
- Mountain Bike Trails
- Hartman Reserve Lowland Forest
- Hartman Reserve Upland Forest

0 90 180 360 540 720
Meters

N

2008 Aerial Photo
Trails made with GPS points (2010)
Hartman Boundary Layers Created by
Jameson Grier
Cartographer: Matthew Frana

4) Utility Corridors

The corridors must be kept free of vegetation to protect the power and phone lines. The staff of HRNC will work with the power company to maintain the 16 foot easement with minimal chemical and mechanical disturbance. Where possible, management will be accomplished by maintaining prairie vegetation and managed with fire.

5) Boundaries

The boundaries around HRNC are subject to encroachment. To control and reduce this impact, boundary signs will be placed and maintained. Expand a buffer by encouraging the private landowners to maintain the existing forest on the HRNC boundary. This buffer can also be created by lease, easement or outright purchase of private lands.

6) Hartman Station/South Riverside Trail

a) Signage

Interpretive and directional signs have been placed at Hartman Station, the Prairie Overlook and Bullfrog Bayou. Check and repair these signs as needed.

b) Maintenance

The staff will work with the cities of Cedar Falls, Waterloo, and private groups to maintain the trail segment that bisects the nature center.

G) Cultural Resources

1) Archaeological Sites

a) Prehistoric Archaeology

Studies conducted in the summers of 2008 and 2009 by the University of Northern Iowa (UNI) Archaeological Field School determined that HRNC contains evidence of prehistoric Native American use. Excavations within the HBSP have unearthed a variety of woodland artifacts as old as 2000 years. There are also indications of burial mounds just outside HRNC. Most of these artifacts are found within a meter of the surface, so an archaeologist should be consulted before any ground breaking work is performed. Hartman Reserve Nature Center should continue to work with UNI to gather evidence of its prehistoric culture. Additional information on HRNC archaeological studies can be found in Appendix 9.

- Consult an archaeologist before any ground breaking work is performed.

b) Historic Archaeology

Studies conducted in the summers of 2008 and 2009 by the UNI Archaeological Field School also found historical evidence on the flood plain portion of the HBSP, as well as the at the Former Nursery Prairie. Much of these findings (including glass, terra cotta, cement, nails) were thought to be post-settlement refuse. Historical significance of these areas is still under debate. Additional information on HRNC archaeological studies can be found in Appendix 9.

2) Cement pads

There are three pads which were foundations for cabins. These cabins were used in a residential camping program by the Black Hawk County YMCA. These pads will be preserved and used as activity sites.

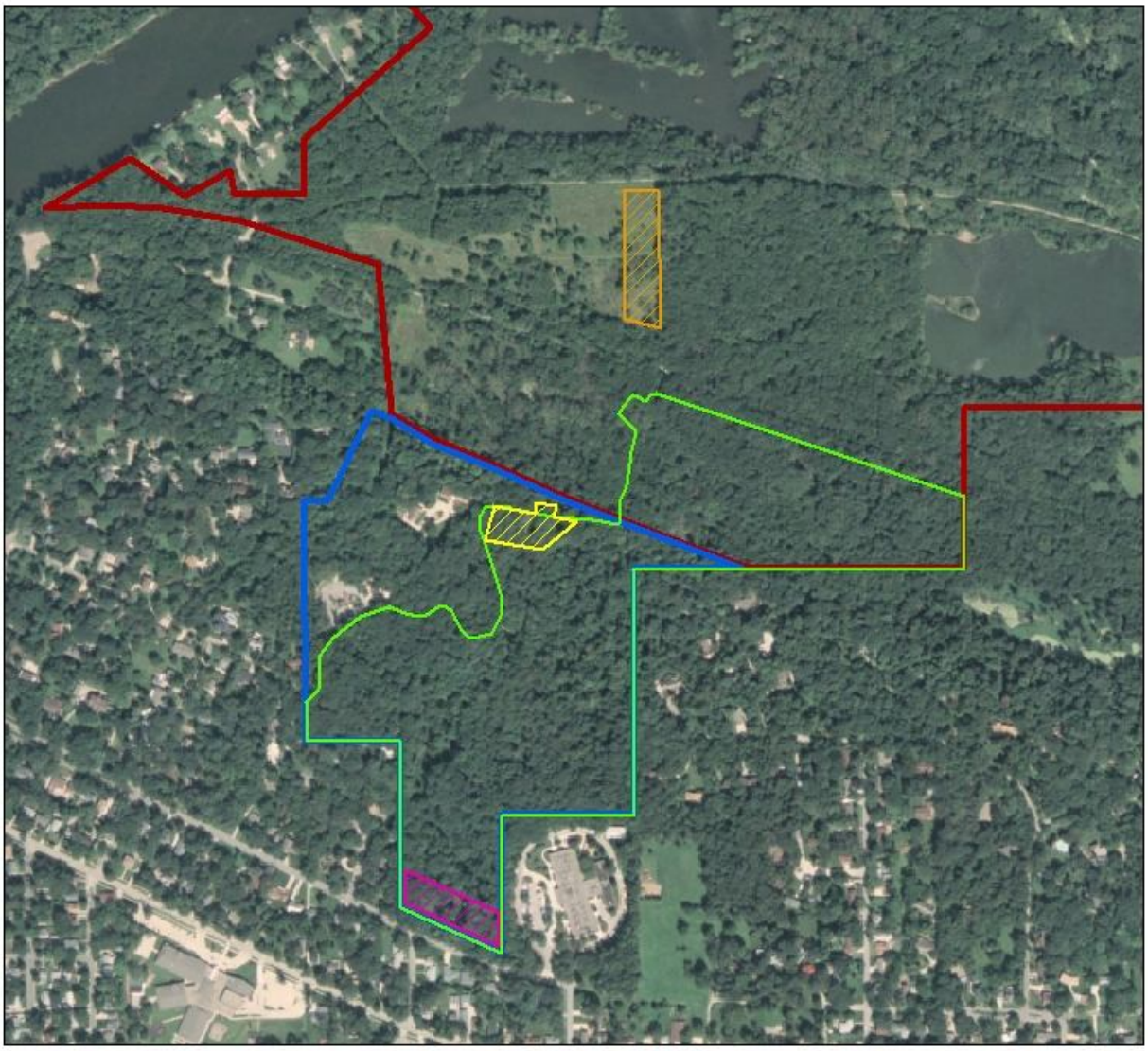
3) Friendship Circle

There was a circle of benches between River Hills School and the ravine in the upland portion of the south unit. These benches and a circle of stones were used during YMCA campfires. This site will be allowed to return to a natural state.

4) Parrot Barn Foundation

This foundation is located in the lowlands of the south unit just west of the current boundary.

Archaeology Sites



Legend

- State Preserve
- Upland Forest
- Lowland Forest

Archaeology Sites

- Project Area
- Berry Patch Site
- Prairie Site

0 70 140 280 420 560 Meters

N

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

H) Volunteers

Volunteers are an important resource for helping HRNC to achieve their management goals. Active recruitment and maintaining good relations are essential for having an adequate volunteer base. Ensuring appropriate training such as chainsaw safety, herbicide application procedures, plant identification, and other safety protocol is necessary to have knowledgeable and safe volunteer support. Volunteer waivers should be signed to relieve Black Hawk County Conservation from any liability issues in the event an individual is hurt while volunteering. A copy of the volunteer wavier can be found in Appendix 14.

I) Monitoring

All management tasks performed and monitoring updates should be recorded on the monitoring sheets provided in Appendix 13. This record will provide information on what has been done in the past, and provides a reference for future management planning.

Hartman Bluff State Preserve

Management Plan

"… to protect a natural area and promote a better understanding of our environment through education, recreation, and community involvement."

Adopted by the
Black Hawk County Conservation Board

Hartman Bluff State Preserve is owned and managed by Black Hawk County Conservation Board

Supervised by:
Vern Fish –Director
Jim Weimer – Wildlife Conservationist

Prepared by:
Mary Cox - mkcox1@gmail.com
Matt Frana - mattyfrana@hotmail.com
Jameson Grier - grierj@uni.edu
Professional Science Masters (PSM)
Ecosystem Management
University of Northern Iowa

PART 2: HARTMAN BLUFF STATE PRESERVE RESOURCE MANAGEMENT PLAN

In 2005, Hartman Bluff State Preserve (HBSP) was certified by the Iowa Department of Natural Resources' State Preserves Advisory Board to recognize the significance of a 46 acre tract of upland and lowland forest within the Hartman Reserve Nature Center (HRNC).

The Iowa State Preserves Program is defined in Chapter 465C.1 of the Code of Iowa. This chapter describes a preserve as "an area of land or water formally dedicated ... for maintenance as nearly as possible in its natural condition though it need not be completely primeval in character at the time of dedication or an area which has unusual flora, fauna, geological, archaeological, scenic, or historical features of scientific or educational value."

I) OVERVIEW

A) Basic Information

1) Location

The southernmost segment of HBSP is also located in Cedar Falls but the majority of the 46 acres is in Waterloo. The HBSP area is located in the northwest quarter of the southwest quarter and the south one-half of the northwest quarter of Section 17, Township 89 North, Range 13 West in Black Hawk County, Iowa.

2) Size

Hartman Reserve Nature Center is 301 acres. A 46.33 acre segment of the South Unit of the nature center has been designated as the HBSP.

3) Access

Hartman Reserve Nature Center is located in Cedar Falls, three blocks north of the intersection of Rainbow Drive and Laurie Avenue. From Highway 218, take the Greenhill Road exit and follow the signs on Rainbow Drive.

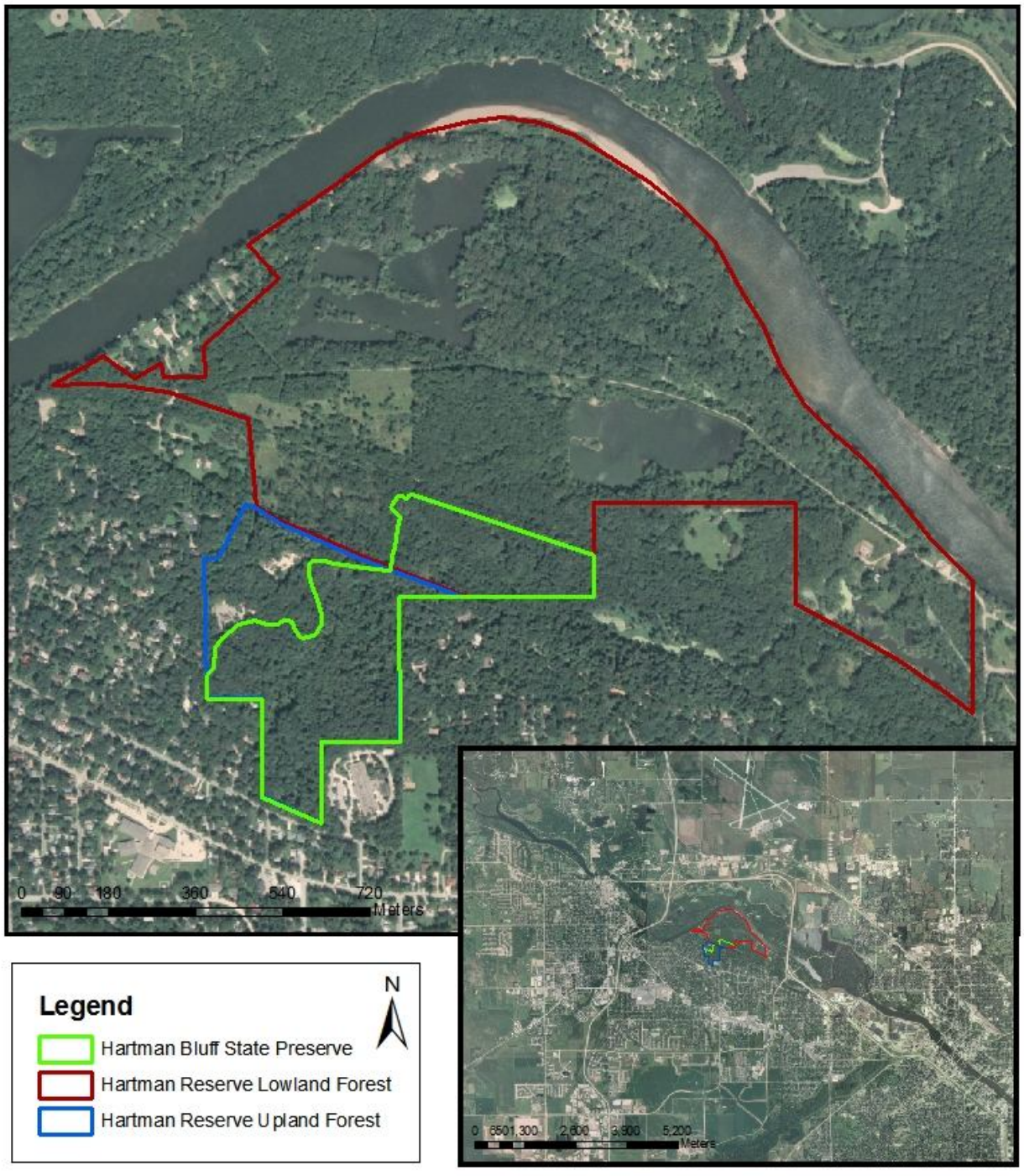
4) Owner & Manager

Hartman Reserve Nature Center is owned and managed by the Black Hawk County Conservation Board.

5) Dedication Records

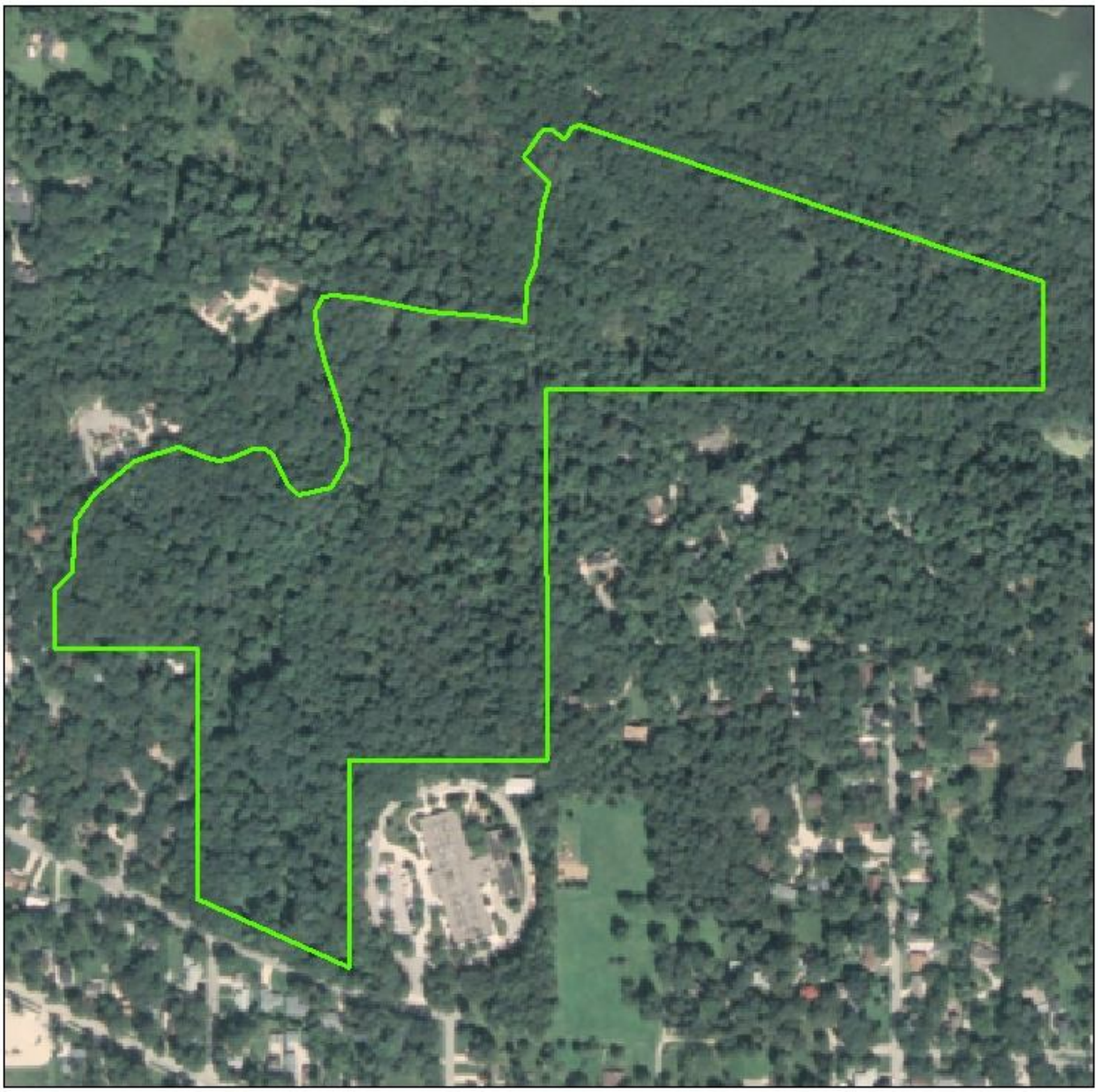
A copy of the signed dedication statement can be located in Appendix 12.

Hartman Reserve Nature Center



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

Hartman Bluff State Preserve



Legend
HBSP

0 40 80 160 240 320
Meters

N

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

B) Features

1) Geomorphic

There are two different geomorphic settings within the 46 acres of HBSP. The upland area represents a maturely-dissected glacial plain. This area is underlain by glacial till deposited during the Pre-Illinoian glacial period, the earliest glaciation in Iowa. The glacial deposits in the area are covered by a relatively thin (usually less than 1 m) blanket of loamy sediment, mostly derived from wind-blown sediments. The lowland area represents a part of the ancient floodplain of the Cedar River, and is underlain by stream deposited sands and gravels. Portions of the floodplain experience flooding on an annual basis, and during severe floods the entire floodplain is inundated. These geomorphic settings are located on the Iowan Surface Landform Region. This large landform region is sandwiched between the Wisconsin Surface in north central Iowa, and the Paleozoic Plateau in northeast Iowa. It is a varied region ranging from intensive agriculture to rich woodland, and from prairie to bog. This geologically complex region serves as a transition zone between the deciduous woodland to the tall grass prairie. The Cedar River flows through much of the region.

2) Flora

Vegetation in the uplands includes mature red oak/maple, maple/basswood, oak/hickory and a restored open white oak forest. The lowland forest consists of mature bottomland hardwoods which include: bur oak, sugar maple, walnut, hackberry, basswood, and silver maple. These forests are examples of the Southeastern Floristic Zone.

Upland and bottomland forest are not rare natural communities in Iowa. Hartman Bluff State Preserve is unique because these common communities have been preserved in an urban setting and are being interpreted through educational programming. Hartman Bluff State Preserve is also being actively managed to regenerate oaks and restore an open white oak forest. These management activities have been incorporated into the education program and involve students and community volunteers. There are very few examples of undisturbed urban forests in Iowa that are open to the public, actively managed, and interpreted through a broad based environmental education program. The bottomland segment of the preserve is the only example of a Southeastern Floristic Zone lowland forest on the Iowan Surface in the Iowa State Preserves System.

On Sept. 26, 2002, a state botanist conducted a survey of the undergrowth in the proposed HBSP (Appendix 1.3). One hundred 1 square-meter plots were established within the upland and lowland areas of HBSP, and all plant species present within the plots were recorded. A total of 55 species were detected in the study. No exotic species were encountered in the plots. The floristic quality index (FQI) was calculated based on these plots and was determined to be 35.4. This score places the surveyed area in to the category of 35 or more which is said to be of "profound importance from a regional perspective" (Wilhelm and Masters 2000). Although, that statement is extraordinary enough for the surveyed area, it is important to note that this surveyed area represented only a small fraction of HRNC and therefore a fraction of the total expected flora. Simply put, the species composition and structure of the undergrowth plant community in the upland and bottomland habitats in the proposed preserve are typical of undisturbed, natural conditions.

3) Fauna

The fauna of HBSP is quite diverse, primarily because of the diverse vegetation which creates diverse habitats. One difficulty in establishing the diversity of the fauna is their seasonality of use and mobility. No formal checklist of animals for HBSP exists, but the vertebrates of the general region are quite well known so that some reasonable assumptions can be made.

a) Invertebrates

The extent of invertebrate diversity at HRNC is virtually unknown. In general, this taxon is quite diverse and serves many important roles. For example, many assist in decomposition/mineral cycling and are essential initial components of food chains.

b) Fish

The few shallow ponds and intermittent streams of HBSP have been known to hold fish. However, these areas are subject to annual drying and freezing; so stable, permanent populations of fish do not exist.

c) Amphibians and Reptiles

Appendix 2.2 lists amphibian and reptile species that have been sighted at HBSP or are known to occur in nearby areas. The list is undoubtedly incomplete and a thorough investigation should be conducted. The existence of some species is greatly dependent upon water conditions in the shallow ponds in the lowland forest region.

One amphibian that merits special consideration is the blue-spotted salamander (*Ambystoma laterale*) which is listed as endangered in Iowa. After three years of monitoring, it has not been found at HRNC, but it does occur across the Cedar River in George Wyth State Park. As of 2010, a project has been initiated to introduce blue-spotted salamanders to HBSP.

d) Birds

The avifauna of HRNC is quite extensive but unfortunately not accurately catalogued. Appendix 2.3 lists species sighted in HRNC and in the surrounding neighborhood. It is quite certain that the list is incomplete as the state has an avifauna of some 360 species. Because there is no standardized program, avifauna nesting, rearing young, seasonal residency, etc. within HRNC cannot be explicitly delineated. However, it is noteworthy to mention that wood ducks and barred owls are among those species known to nest in HRNC. The pileated woodpecker is commonly seen and likely nests at HRNC. In the spring, it is possible to see seven species of woodpeckers at HRNC.

The Iowa Audubon recognized HRNC as an Important Bird Area (IBA) in 2004. HRNC was dedicated as an IBA because it is home to at least three species of high conservation priority: red-shouldered hawk, pileated woodpecker, and white-eyed vireo. It is reasonable to assume that HBSP is also an important part of their habitat.

e) Mammals

A list of HBSP mammals is presented in Appendix 2.4. The mobility of this taxon results in many of the species being found in both types of forest. The larger mammals often enter HRNC from the north as they move from and along the river through the lowland forest which serves as a corridor to and from the river. The upland forest supports the red squirrel (*Tamiasciurus hudsonicus*) which is near its southern-most limit of distribution.

4) Replication with other preserves

The upland forest is an example of the Southeastern Floristic Zone found on the Iowan Surface. In the Iowa State Preserves System, there are only four examples of this forest type: Behrens Pond & Woodland, Casey's Paha, Mericle Woods and Hanging Bog. Currently, there is not another example of an undisturbed bottomland forest representing the Southeastern Floristic Zone on the Iowan Surface in the Iowa State Preserves System.

C) Land Use

1) Current

The area is open to public use that includes hiking, skiing, snowshoeing, maple tree tapping, educational programs and resource management activities.

2) Adverse impacts

a. Hartman Bluff State Preserve is located in the heart of metropolitan Black Hawk County and thousands of people walk and explore the trails each year. The impact of this use is hard to document and may be unavoidable.

b. The stormwater runoff from the River Hills School parking lot drains into the upland segment of the preserve. This runoff has enlarged the existing drainage through erosion and has created a system of significant ravines.

c. A portion of the River Hills School parking lot measuring approximately 100 yards long and 15 feet wide lies on county property. Part of this area has been paved, and the remainder is maintained as turf. This corridor would be within the state preserve. We will work with River Hills School to ensure this area is not enlarged.

II) MANAGEMENT PLAN

A) General Management

Tasks listed below will be applied throughout Hartman Bluff State Preserve. Site specific management plans are included later in the management plan.

1. Manage the habitat to maintain a diversity of native plants and animals.
2. Survey and monitor the flora and fauna to determine species composition and trends. Species lists can be found in Appendix 2.
3. Control invasive species by training staff, recruiting & training volunteers and scheduling service learning opportunities for volunteers. Volunteer guidelines can be found in Section II.J. A list of invasive species and removal procedures can be found in Appendix 4.
4. Manage the forest to maintain examples of a maple-basswood complex, regenerate oaks and reestablish open oak woods.
5. Control herbivore populations to maintain native biodiversity. Deer management decisions will take into consideration the recommendations of the Black Hawk County Deer Task Force (Appendix 7).
6. Maintain a trail system and physical facilities by conducting semiannual inspections and making repairs as needed. See II.F.2 for further guidelines.
7. Control the size of groups and concentrate activities in the active use areas. Organized groups should be limited to 180 people.
8. Provide equal access by maintaining paved trails to the Interpretive Center, Gene & Betty Buckles Program Center, Tree House Deck, and Friends Shelter.
9. Restrict the use of bikes, horses and motorized vehicles. Mountain bike riding is only allowed on hiking trails north of Cedar Valley Bike Trail.
10. Provide access for educational & research projects.
11. Consult an archaeologist before any ground breaking begins to ensure sites of cultural significance aren't disturbed. Refer to Section II.G.1.
12. Manage storm water runoff by working with city, neighbors, and other willing stakeholders. Refer to Section II.C.4.
13. Review and update the plan annually, and revise the plan every five years.

B) Top Priority Management

1) Short Term

These tasks should be accomplished this year (2010) and updated yearly:

- Develop a forest stand map and incorporate it into the management plan.
- Develop site-specific burn plans and incorporate them into the management plan.
- Cut and drop downed trees into the ravine system to cheaply and quickly aid in stormwater management.
- Update the status of mapped flora of special interest. Refer to Section II.E.1.
- Map the unmapped flora of special interest. Refer to unmapped Flora of special interest. Refer to Section II.E.1.

2) Long Term

These tasks are ongoing:

- Look for opportunities for land acquisition through easements, donations, and purchases to create buffers around HRNC.
- Continue to initiate stormwater management activities. Refer to Section II.C.4.
- Continue to initiate the blue-spotted salamander introduction. Refer to Section II.E.2.e.

C) Upland Forest

The 30.2 acres of upland forest are included in HBSP, which is located in the southeast corner of the South Unit of HRNC.. This area includes open, xeric, oak-hickory forest and a closed mesic, maple-basswood forest climax. A bluff separates the uplands from the lowland segment of HBSP to the north. The east boundary is flanked by a wooded ravine and a line of homes. The southern boundary is defined by River Hills School and Grand Blvd. The western boundary is flanked by homes on Timber Drive and Oak Loop Trail adjacent to the Interpretive Center.

Due to the state preserve status, it adheres to additional regulations determined by the Iowa State Preserves Advisory Board. Regulations restrict major construction projects or environmental changes without prior approval from the Iowa State Preserves Advisory Board. Special management zones within HBSP include: White Oak Stand, Red Oak Stand I and II, gullies, and archaeological sites.

1) White Oak Stand

To regenerate white oaks in the uplands, controlled burns and selective cutting will be used in the 10 acre White Oak Stand near River Hills School. This zone is divided into a northern and southern zone by a stream that drains from the River Hills parking lot to the east. A timeline of management activities since 1999 can be found in Appendix 5.

- Work with the district forester to develop a stand map and management strategy to maintain optimal white oak savanna conditions. Refer to this strategy when completed.
- Continue to open the canopy and maintain a trajectory towards a white oak savanna by removing unwanted tree species such as maples, ashes, basswoods, box elder, mulberry, elm, honey locust, ironwood, honeysuckle, and buckthorn.
- Develop a scheduled burn plan for the area. Burns ought to be conducted every 1-2 years alternating between the north and south zones. Refer to this burn plan when completed.
- Use staff and volunteers to encourage white oak regeneration by scattering acorns, caging small trees, planting seedlings, and removing invasive species.
- Continue to monitor and record work performed at the site in Appendix 13.

2) Red Oak Stands I & II

To regenerate red oaks in the uplands, the plan calls for selective cutting in two separate areas: Red Oak I and Red Oak II. Red Oak I is a 0.6 acre site that is located south of the Mary Kay Eakin Bridge. Red Oak II is a 1.3 acre site located south of Kay Romanin Bridge. A timeline of management activities since 1999 can be found in Appendix 5.

- Work with the district forester to develop a stand map and management strategy to maintain optimal red oak savanna conditions. Refer to this strategy when completed.
- Continue to open the canopy and maintain a trajectory towards a red oak savanna by removing unwanted tree species such as maples, ashes, basswoods, box elder, mulberry, elm, honey locust, ironwood, honeysuckle, and buckthorn.
- Develop a scheduled burn plan for the area. Refer to this burn plan when completed.
- Use staff and volunteers to encourage white oak regeneration by scattering acorns, caging small trees, planting seedlings, and removing invasive species.
- Continue to monitor and record work performed at the site in Appendix 13.

3) Sugar Bush

A stand of sugar maple trees surrounds the Interpretive Center at HRNC. This stand should be maintained at its current size to provide valuable educational experiences for the public by demonstrating maple tree tapping for maple syrup, as well as a source of income for HRNC.

- Work with the district forester to develop a stand map and management strategy to maintain optimal sugar maple tree conditions. Refer to this strategy when completed.
- Use staff and volunteers to enhance the site by removing invasive species.
- Continue to monitor and record work performed at the site in Appendix 13.

4) Stormwater Management

Intermittent streams would have been a natural occurrence through the HRNC bluff. However, due to increased stormwater runoff from residential areas and streets surrounding HRNC, there is now substantial erosion occurring throughout the bluffs. This causes environmental degradation through soil loss, pollution, and disrupting potential archaeological sites within the HRNC. Strategies for combating this problem would require HRNC and residential neighbors to install structures to reduce the amount and rate of stormwater flow. Such structures include: rain barrels, rain gardens, storm chambers, and permeable cement. HRNC has installed a rain garden in its parking lot, and is currently working with River Hills School to install a storm chamber in their parking lot.

There are a number of fallen trees across the ravine system which could be utilized for erosion control. Under ideal conditions these "dead falls" should be left in place as part of the natural cycle and wild aesthetic; however the potential value as erosion control may be more important. Portions of these downed trees could be cut and dropped into the ravine slowing the flow of water and forming small retention barriers for soil accumulation and as an aid for potential vegetation growth. Some seeding of specific plants which grow well in this environment, such as fowl manna grass (*Glyceria striata)* may help. Seed should come from native species found within HRNC (Appendix 1.4). Other construction or planting may be warranted, but since there are restrictions on these activities within HBSP, these methods could be tested in the gullies that lie outside HBSP and monitored for effectiveness. If deemed effective they could then be proposed for use in HBSP.

- Identify key areas of concern.
- Cut and drop downed trees into the ravine system to cheaply and quickly aid in stormwater management.
- Design treatments that fit the landscape.
- Continue to work with neighbors surrounding HRNC to educate and encourage them to implement stormwater reduction methods (rain barrels, rain gardens, storm chambers, and permeable cement).
- Research solutions to implement within ravines to reduce erosion.
- Continue to look for donors like the Community Foundation of Northeast Iowa to contribute to stormwater management efforts.

Stormwater Management

Legend

- Roads
- Gullies
- Upland Forest

0 40 80 160 240 320 Meters

N

2009 Aerial Photo
Interpreted from Hillshade Map
Cartographer: Jameson Grier (2010)

D) Lowland Forest

The lowland forest included in the HBSP is located in the east lowlands of the South Unit of HRNC and includes 16.1 acres. The north boundary is defined by the South Riverside Recreation Trail. The eastern boundary is flanked by private property that provides an extensive buffer of lowland forest. The southern boundary is defined by a bluff and private property. The western boundary is marked by a trail that leads to Hartman Station and splits the lowlands in half. This segment of HBSP is only accessible by a foot trail that is seasonally flooded. This area has been selected as a reintroduction spot for the blue-spotted salamander.

- Work with the district forester to develop a stand map and management strategy to maintain optimal lowland forest conditions. Refer to this strategy when completed.
- Watch for signs of non-native and invasive species, which have a tendency to enter areas through flooding.
- Monitor species and record work performed Appendix 13.

E) Special Interest Species

1) Flora of special interest

Mapped Species

Efforts should be made to check on and update status of these species on a yearly basis.

a) Assiniboia Sedge (upland)

The rare assiniboia sedge (*Carex assiniboinensis)* has been proposed for listing on Iowa's Threatened, Endangered, and Special Concern Plant List. It can be found in the herbaceous layer of the upland forest. A localized but very dense population of this species was observed near River Hills School. Evidently, part of the population occurs on school property and part is located on HRNC property HBSP. The density of the population is striking as this species is excluding most other herbaceous growth in the immediate vicinity where it occurs. While not observed elsewhere, certainly a small number of plants could be overlooked. At present, the area should simply be monitored and not significantly manipulated.

b) Beak Grass (upland)

Beak grass (*Diarrhena americana)* is a perennial found in deciduous forests with medium wet soils in part shade to full shade. It naturalizes by slender, creeping rhizomes and can form dense colonies in optimum growing conditions. Beak grass blooms in early August through early September; fruiting occurs early September through early October. It is an uncommon species for the area.

c) Lousewort (upland)

Lousewort *(Pedicularis canadensis)* is historically found in mesic to dry black soil prairies, open woodlands and sandy woodlands, savannas and sandy savannas, thickets, and borders of lakes. This plant is often associated with HRNC's oak woodlands and savannas. It is partially parasitic and gets nutrients from the roots of other plants. Lousewort flowers April to June.

d) Green Dragon (Lowland)

According to the 2005 botanical survey, the green dragon (*Arisaema dracontium)* is considered to be a rare plant in Iowa. Although, it has never been officially documented in Black Hawk County. Through the Geographic Information System (GIS) monitoring program, a small, yet successful population was discovered and mapped in the east lowlands. In central Iowa, this species is at its western most range where it suffers from increased vulnerability due to encroachment. Its rare status and unique form make this species especially valuable as an educational tool and an important part of our native plant collection. The lowlands of HBSP provide the ideal moisture and light conditions for the green dragon. It is included in the Threatened Species Restoration Project (Appendix 11). It flowers May to June, and fruits late summer.

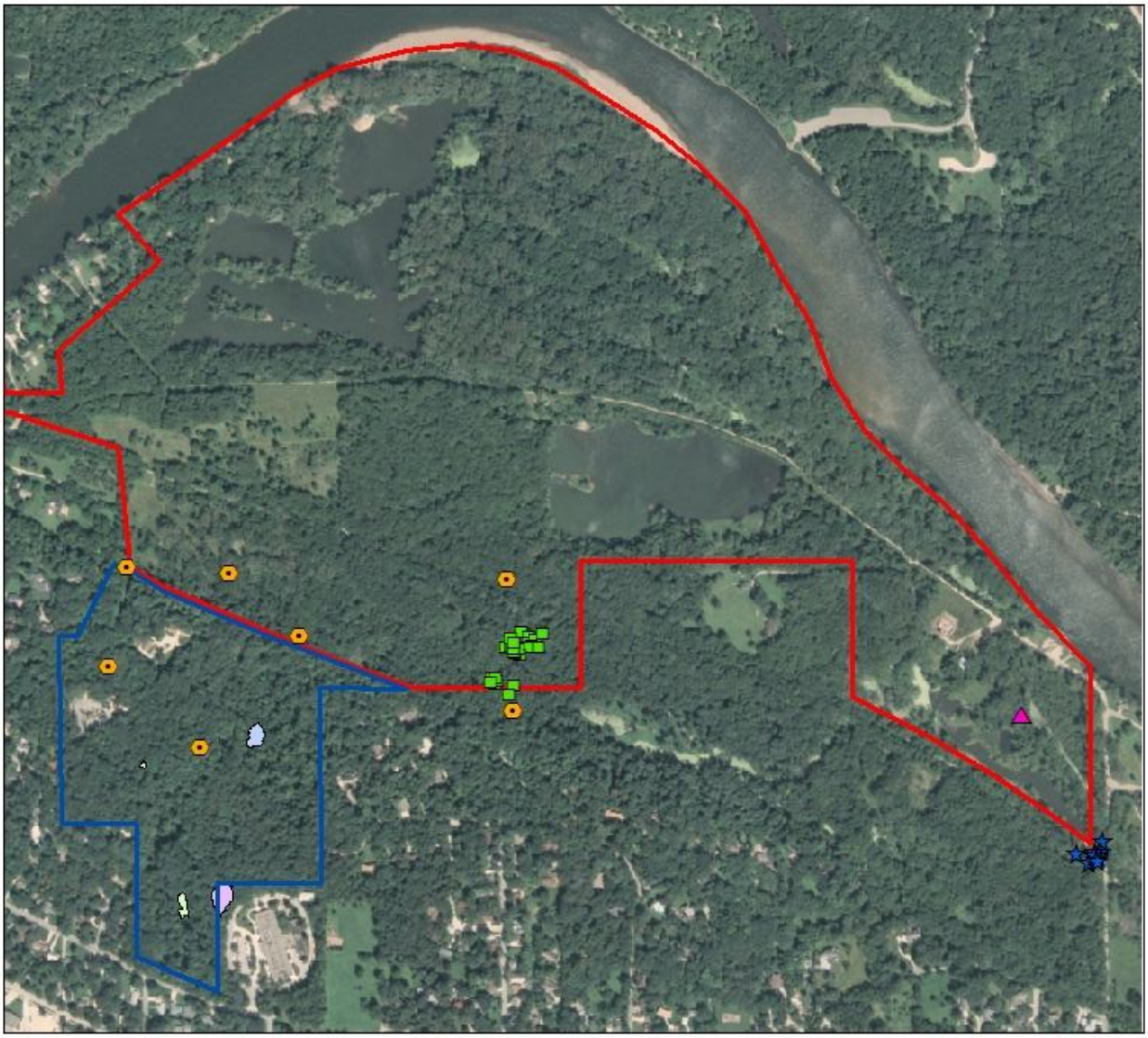
- Due to the green dragon's location in the HBSP, management to enhance the population of green dragon should be done in coordination with the Iowa State Preserves Advisory Board and other outside consultants.

e) Butternut (throughout)

The once strong butternut *(Juglans cinerea)* has been declining since the 1967 introduction of butternut canker. Although it is not federally listed as threatened, three states have listed it on their lists. This species has become very rare through much of its range in Iowa. During the botanical survey, Watson found only five trees on the entire HRNC property, of which some are currently showing signs of butternut canker. A few more plants have been discovered and mapped through the geographic information systems (GIS) monitoring program. All of the discovered trees are suffering from cankers. Butternut is a small stature tree that prefers well-lit areas, which makes it vulnerable to being shaded out by the larger maples and oaks. Butternut is included in the Threatened Species Restoration Project (Appendix 11).

- To increase the population, fallen nuts can be collected and planted in the more open savanna areas.

Hartman Plant Species of Interest



Legend

- Green Dragon (31 plants)
- Glade Mallow (14 plants)
- Buttonbush (2 plants)
- Butternut (7 plants)
- Upland Forest
- Lowland Forest

Plant Colonies

- Assiniboia Sedge
- Beak Grass
- Louse Wort

N

0 70 140 280 420 560 Meters

2009 Aerial Photo
GPS Data from BHCCB
Cartographer: Jameson Grier (2010)

Not Mapped

Attempts should be made to locate these species, use a global positioning system (GPS) to record their locations, and map them on geographic information systems (GIS) software. They should also be located on a yearly basis and have their status updated. Monitoring sheets can be found in Appendix 13.

f) Sessile-leaved bellwort (upland)

The rare sessile-leaved bellwort (*Uvularia sessilifolia)* occurs on the west facing slope of Red Oak II. This is the only location in HRNC where this species was observed and may prefer an open habitat (Appendix 1.4). Sessile-leaved bellwort flowers May to June.

g) Ravine species (upland) – Indian pipe, showy orchis, rattlesnake root, ginseng, wild honeysuckle

The only county location of the uncommon mycotroph Indian pipe (*Monotropa uniflora*) was last seen in the 1980's on the northerly slope of the ravine system. Indian pipe flowers from June to September.

Other portions of the ravine system support additional unusual to uncommon plants such as the showy orchis (*Orchis spectabilis*) which flowers May to June; limber honeysuckle (*Lonicera dioica*) which flowers May to June; ginseng (*Panax quinquefolius*) which flowers from June to October; and rattlesnake root (*Prenanthes alba*) which blooms August to September. (Appendix 1.2)

- When removing honeysuckle for management purposes, be aware of the differences between the native and invasive species. There are two native shrubs (*Diervilla lonicera* and *L. canadensis*), three native vines (*L. dioica, L. reticulate, L. sempervirens*), and the five invasives (*L. maackii*, *L. morrowii*, *L. japonica*, *L. tataritica*, and *L.* x *bella*). See Appendix 4.

2) Fauna of special interest

The Iowa Audubon recognized HRNC as an Important Bird Area (IBA) in 2004. Hartman Reserve Nature Center was dedicated as an IBA because it is home to at least three species of high conservation priority: the pileated woodpecker, red-shouldered hawk, and white-eyed vireo. Hartman Reserve Nature Center also has an urban deer hunting program, osprey reintroduction program, and is in the process of initiating a blue-spotted salamander reintroduction program.

a) Pileated Woodpecker

The pileated woodpecker regularly frequents the area and probably also nests at HRNC. It prefers bottomland forest habitat where it can find ants, wood-boring beetles, other insects, acorns, and berries to eat. It also prefers habitat which contains large dead trees to nest in. It is important to leave some dead trees standing for the use of pileated woodpecker and other fauna.

- Refrain from removing large dead trees

b) Red-shouldered hawk

The red-shouldered hawk is currently listed as endangered on Iowa's endangered, threatened and special concern animals list. They nest in large tracts of mature to old-growth woodlands; especially bottomland hardwoods, riparian areas, and flooded deciduous swamps. Their nests are made of large sticks in a fork of the main trunk of a dominant tree or where a primary branch meets the trunk. They feed along the wooded margins of marshes; often close to cultivated fields and natural openings. Their primary preyare small mammals, birds, amphibians, reptiles and invertebrates.

c) White-Eyed Vireo

The white-eyed vireo is a small migratory songbird that is uncommon to Iowa. They breed and nest at HRNC, which is at their northern most limits. They prefer low bushes and shrubs in abandoned cultivated fields or overgrown pastures. They are often found in bramble patches. When workers are removing invasive bramble patches, they should be aware of what the bird and their nests look like to avoid disturbing them. The grass-lined nest is a neat cup shape, attached to a fork in a tree branch by spider webs. During the breeding season, their diet consists almost exclusively of insects, primarily caterpillars.

- Refrain from removing bramble patches if a white-eyed vireo nest is present.

d) Deer Management

In order to maintain healthy deer populations within HRNC, certified hunters can register for a special bow hunting permit within city limits. The management goal is to maintain a population of less than 30 deer/sq. mile. Supplemental information and results of the program can be found in Appendix 7.

e) Blue-Spotted Salamander

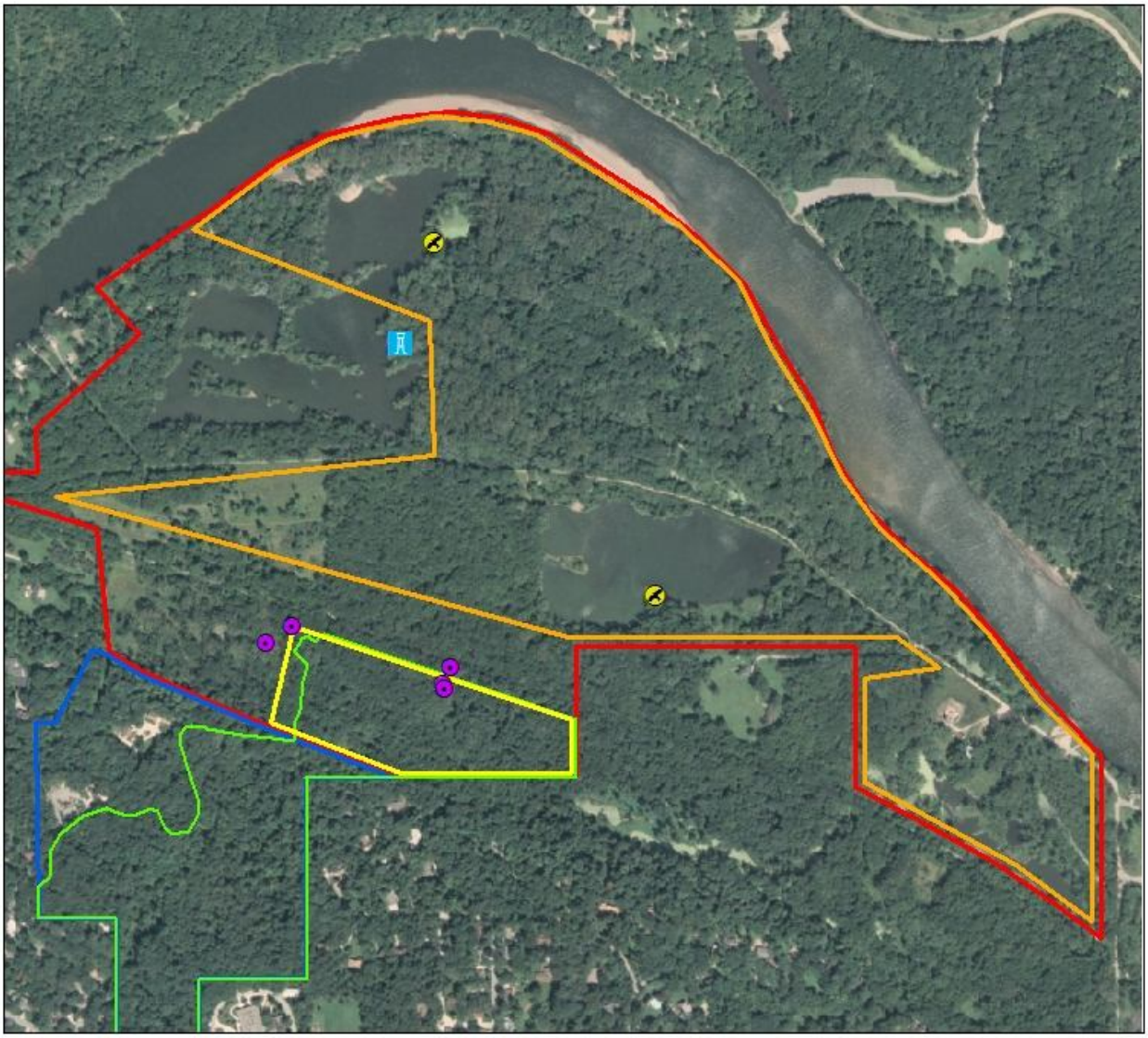
The blue-spotted salamander (*Ambystoma laterale*) is listed as endangered on the Iowa endangered, threatened and special concern animals list. Black Hawk County and Linn County contain the only two known populations in Iowa. The blue-spotted population in Black Hawk County is in George Wyth State Park, which is located across the Cedar River from HRNC. As part of HRNC's Threatened Species Restoration Project (Appendix 11), plans are being made to release blue-spotted salamanders in the eastern section of the lowland forest of HBSP.

Blue-spotted salamanders will be collected from the George Wyth State Park population and transported to the Henry Doorly Zoo in Omaha, NE where a breeding program will be initiated. The tadpoles that result from this breeding program would be released at the five pool sites in HBSP that have been monitored for blue-spotted salamanders the last three years.

A work plan has been drafted and staff are working to obtain permits. Working with Iowa Department of Natural Resources, Omaha's Henry Doorly Zoo, and Natural Resources Conservation Service, an introduction is slated for 2011. See Appendix 10 for the work plan.

- The five release pool sites should continue to be protected and monitored by trained staff and volunteers prior to and following the release.

Hartman Wildlife Species of Interest



Legend

- Salamander Traps

Deer Hunting

- DMZ Zone C
- DMZ Zone C-1

Osprey

- Valley Park Hacking Tower
- Nest Platform

- Upland Forest
- Lowland Forest
- State Preserve

N

0 70 140 280 420 560
Meters

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

f) Red Squirrel

The red squirrel lives in dense pine forests or dense hardwood forests with a thick understory. It eats tree buds, leaves, flowers, fungi, acorns, bark, berries, hickory nuts, pine nuts, walnuts, insects, and the seeds of other trees. HRNC supports red squirrels which are near its southern-most limit of distribution. Its presence is an important reason for maintaining the area as an undeveloped and relatively undisturbed site.

F) Active Use Areas

The identified active use areas are inspected semiannually. Maintenance takes place as staff and resources allow. Each area has been assigned a management strategy. Little or no additional development should occur in HBSP unless it significantly contributes to management objectives.

1) Parking lots and roads

Vegetation along the parking lots and roads will be is trimmed back 2-3 feet from the edge of the lot each summer. Dead snags within 10 feet of the edge are identified and removed.

2) Trails, Bridges and Decks

Upland trail surfaces will be wood chipped or graveled. Vegetation will be trimmed back 2-3 feet from the edge and all dead snags within 10 feet will be removed. Wet spots will be bridged with planks and downed trees will be removed and a clear passage maintained.

3) Boundaries

The boundaries around HRNC will be subject to encroachment. To control and reduce this impact, boundary signs will be placed and maintained.

G) Cultural Resources

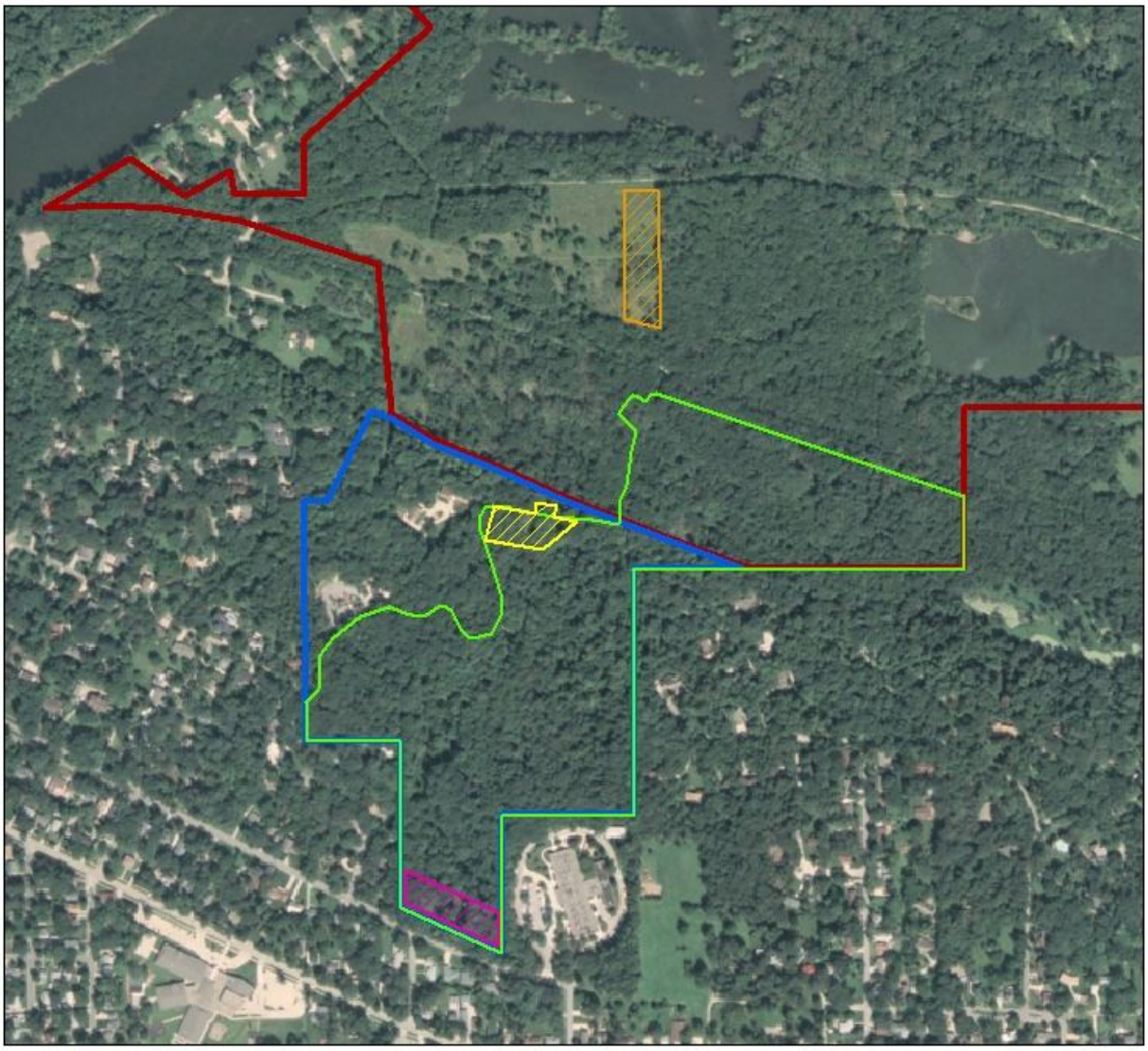
Studies conducted in the summers of 2008 and 2009 by the University of Northern Iowa (UNI) Archaeological Field School determined that HRNC contains evidence of prehistoric Native American use. Excavations within the HBSP have unearthed a variety of woodland artifacts as old as 2000 years. There are also indications of burial mounds just outside HRNC. Most of these artifacts are found within a meter of the surface, so an archaeologist should be consulted before any ground breaking work is performed. Hartman Reserve Nature Center should continue to work with UNI to gather evidence of its prehistoric culture. Additional information on HRNC archaeological studies can be found in Appendix 9.

- Consult an archaeologist before any ground breaking work is performed.

a) Historic Archaeology

Studies conducted in the summers of 2008 and 2009 by the UNI Archaeological Field School also found historical evidence on the flood plain portion of the HBSP, as well as the at the Former Nursery Prairie. Much of these findings (including glass, terra cotta, cement, nails) were thought to be post-settlement refuse. Historical significance of these areas is still under debate. Additional information on HRNC archaeological studies can be found in Appendix 9.

Archaeology Sites



Legend

- State Preserve
- Upland Forest
- Lowland Forest

Archaeology Sites

- Project Area
- Berry Patch Site
- Prairie Site

0 70 140 280 420 560 Meters

N

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

H) Acquisition Needs

To maintain a natural buffer for the lowlands, it is necessary to work with the private landowners on the eastern boundary to preserve the existing forest between the HRNC boundary and Hackett Road. This existing buffer can be maintained by mutual agreement, lease, easement or outright purchase of private lands. It is also necessary to maintain the natural buffer for the upland segment of HBSP. Currently, the ravine to the east supports a high quality upland forest. This existing buffer should also be maintained by mutual agreement, lease, easement or outright purchase of private lands.

One site of value adjacent to the upland forest is the meadow pasture with a small stream to the northeast of River Hills School. Here the upland forest is invading into the pasture and presents an example of forest succession. Inclusion of this property would provide an additional buffer to the upland segment of HBSP.

I) Visitor Use

1) Access

Hartman Bluff State Preserve can be accessed by following the directional signs off of Rainbow Drive in Cedar Falls or Waterloo. These signs direct the visitor to the HRNC parking lot where they can hike into HBSP. Visitors can also access the HBSP from River Hills School, which can be found at the east end of Grand Boulevard in Cedar Falls. The South Riverside Trail will take the visitor to Hartman Station where they can park their bike and hike into HBSP.

2) Facility Placement

Creating directional and interpretive signs could benefit the public understanding of HBSP as well as develop support for HRNC. Possible locations for signage could include:

- HRNC parking lot
- River Hills parking lot
- Hartman Station
- Trail intersections and key locations

3) Uses

The following activities will be controlled by the Black Hawk County Conservation Board to protect HBSP:

a) Educational programs

Activities will be restricted to the trails except when the educational value justifies going off the established path.

b) Recreational activities

Most activities will be restricted to the trails and group sizes will be limited. Mountain bikes, horses, motorized vehicles, and other recreational activities that might impact HBSP will be restricted.

c) Scientific research & collecting.

Research and collecting will be permitted under the guidelines of the Black Hawk County Conservation Board.

d) Camping

No camping will be allowed in HBSP.

e) Timber stand improvement & burning

Selective cutting and burning may be used to regenerate oaks, create an open oak woods, and to maintain biodiversity.

f) Hunting & Trapping.

Hunting and trapping may be used as a tool for wildlife management.

J) Volunteers

Volunteers are an important resource for helping HRNC to achieve their management goals. Active recruitment and maintaining good relations are essential for having an adequate volunteer base. Ensuring appropriate training such as chainsaw safety, herbicide application procedures, plant identification, and other safety protocol is necessary to have knowledgeable and safe volunteer support. Volunteer waivers should be signed to relieve Black Hawk County Conservation from any liability issues in the event an individual is hurt while volunteering. A copy of the volunteer wavier can be found in Appendix 14.

J) Monitoring

All management tasks performed and monitoring updates should be recorded on the monitoring sheets provided in Appendix 13. This record will provide information on what has been done in the past, and provides a reference for future management planning.

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