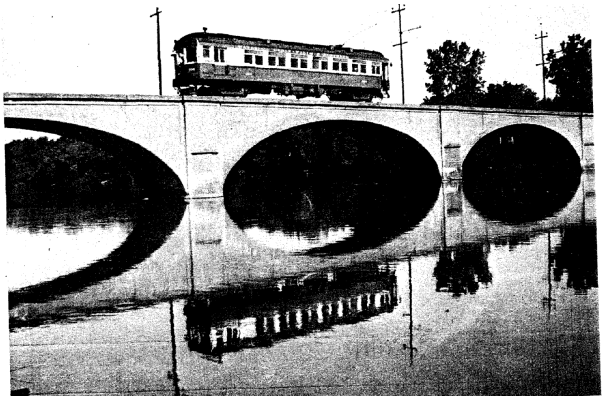
Cedar Valley Nature Trail: Restoration Management Plan

Prepared by Pieter Ver Steeg and Adam Rodenberg, PSM-EM,

University of Northern Iowa

May 2011



Above, photograph of Evansdale Bridge, 1956. Below, photographs of the Prairie Remnant Area and north of the Gazebo Area, fall 2010.

Record of Annual Review and Revisions

Year	Date Completed	Reviewers	Revisions (if any)
2012			
2013			
2014			
2015			
2016			
2017			
2018			
2019			
2020			
2021			

Table of Contents

1 Executive Summary

The Cedar Valley Nature Trail (CVNT) is a recreational trail spanning a total of 52 miles through Blackhawk, Benton, Buchannan, and Lynn Counties in Eastern Iowa. This management plan focuses on the northern five miles between Gilbertville and Evansdale, IA in Blackhawk County. This portion is currently maintained by the Blackhawk County Conservation Board (BHCCB), and was acquired in 1986 as part of the Trails From Rails project. Prior to this time the CVNT was an abandoned passenger car railroad line that was home to remnant dry prairie species, some of which persist in a few spots today. Historically the site was very open with trees occurring only in close proximity to the Cedar River. Over time, due to a lack of fire and/or coordinated, active management, Siberian elm (*Ulmus pumula*) and Cottonwood (*Populus deltoides*) have established themselves in significant numbers along the trail. These two dominant tree species besides shading out the native plant communities possess relatively fragile and fracture-prone branches that frequently litter the trail, hindering recreational use and absorbing management resources. The trail also functions as a habitat corridor along the Cedar River for migratory and resident bird species. With biological integrity for both bird species and the remnant native plant communities that remain, and with recreational users in mind, this plan was constructed to maintain and enhance the functions of the CVNT. Priorities include:

- Enhancing and expanding a remnant dry prairie near the Evansdale Bridge
- Prairie planting enhancement
- View expansion and bird habitat improvement from the gazebo site near Gilbertville
- Maintaining various successional stages of plant communities along CVNT for birding habitat, either through native tree replacement or other management
- Installation of interpretive signs paid for by Cedar Trails Partnership
- General maintenance tasks

This ecosystem based management plan represents coordination between the University of Iowa Professional Science Masters in Ecosystem Management program (PSM-EM) and the BHCCB. The mission of the BHCCB as defined in the Pathway, a strategic plan adopted by the BHCCB in 2009, is,

> "… to acquire, develop, maintain, and make available to the inhabitants of the county public museums, parks, preserves, parkways, playgrounds, recreational areas, recreation centers, county forests, wildlife and other conservation areas, and to promote and preserve the health and general welfare of the people; and to encourage the development and conservation of natural resources; and to cultivate good citizenship by providing adequate programs of public recreation." (BHCCB Pathway 2009)

With this mission at the forefront of the activities of the BHCCB, the proper management of natural areas for wildlife habitat as well as recreation is their number one imperative. Furthermore, the Iowa State Comprehensive Outdoor Recreation Plan (SCORP) Performance Goal 8 dictates that in order to apply to receive funds through federal grants, the BHCCB must "plan, develop, and maintain natural resources through an ecosystem based approach to protect the area's endemic flora and fauna and to provide for a quality recreation experience." This being so, developing a management plan for the CVNT is a necessity for the BHCCB.

2 Site Description

2.1 Location

The CVNT section that is of concern for this management plan falls between Gilbertville, IA and Evansdale, IA, in the Cedar and Poyner Townships in the Waterloo South Quadrangle of Blackhawk County, T89N R13W and T88N R12W. The CVNT runs northwest to southeast, from the Evansdale Bridge crossing the Cedar River, to Gilbertville, IA near a retired train depot owned by the BHCCB. Since the trail is linear, it would fall into several subsections, and thus the description is only written out to section. The total length of this section of trail is 5 miles. **Figure 1** contains a map of Cedar Falls and Waterloo, IA, with the section of the CVNT included in this management plan highlighted in red. The total size of the property that BHCCB owns or manages between Evansdale and Gilbertville along the CVNT is approximately 105 acres. This figure includes the area of the trail itself, a recent flood buyout house property, and Schaefer's Natural Area. As of summer 2011 (after completion of the construction of the Evansdale bridge by Peterson Contractors Incorporated), the trail will be accessible either from the north at the Evansdale bridge, off River Road, or from the south at Gilbertville off East Washburn Road (Co Hwy D38).

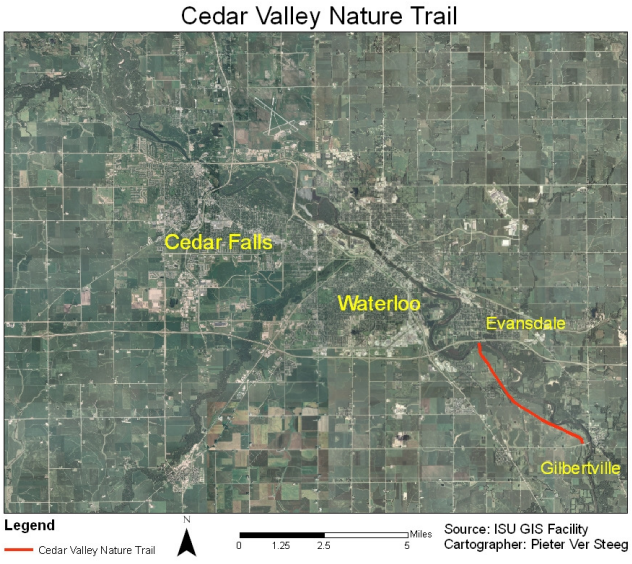


Figure 1. A 2009 aerial photograph of the Cedar Falls and Waterloo area including Evansdale and Gilbertville, IA. The CVNT is highlighted in red, running along the Cedar River.

2.2 Ownership and History

From the mid nineteenth century until the first decade of the twentieth, the CVNT was a horse car line. Buggies moved people and goods between La Porte City and Waterloo regularly (Corwin 1983). With the advent of wide-scale electricity generation and the expansion of steam cars, the Cass family of Waterloo purchased the property and constructed an interurban rail car line, linking Waterloo with La Porte, and eventually south with Cedar Rapids and Iowa City, reaching as far north as Sumner (in conjunction with other lines and companies). A map of the entire rail line (known as the Cedar Valley Road) can be found in **Appendix A, figure 1**. The three Cass brothers (Louis S., Claude D., and Joseph F.) operated the line as the Waterloo, Cedar Falls, and Northern rail line (WCF&N), under the Waterloo and Cedar Falls Rapid Transit Company starting in 1895. Service of the WCF&N continued through two world wars, ceasing in the late 1940s (Carlson 1975). Little is known about the trail from this time, until it was converted to bike trail through the Trails From Rails program in the 1980s. The BHCCB acquired the entire CVNT, from Evansdale through McFarlane Park (2.5 miles south of La Porte City), and into Butler County in 1986.

Selected aerial photographs are available in **Appendix A, figures 2 and 3**. The earliest photographs available were from the 1930s, and the most current was 2009. Other selected years are available online at www.ortho.gis.iastate.edu/, and can be downloaded for use in GIS as georeferenced.TIF files, or as simple JPEG images. What can be observed from the included photographs is that the trail during the 1930s (and also assuming before this time), was much more open likely with prairie vegetation on either side. Since that time though, Siberian elm (*Ulmus pumula*), Cottonwood (*Populus deltoides*), and Eastern Red Cedar (*Juniperus virginiana*) have encroached and shaded out many of the open prairie spots, with only a few remnants remaining.

2.3 Ecosystem Background

Since the days of European settlement, the native prairie ecosystem of Midwest North America has witnessed a remarkable decline. Overall only an estimated 3% remains over the whole of the continent, and only 0.1% of the original extent can be observed in Iowa (Smith 1990). Black Hawk County provides a superb example of the decimation that has occurred. Greater than 95% of the county has been converted from native ecosystem to row crop agriculture. Only a few scattered

remnants and restored natural areas remain in Blackhawk County, owned and managed by a variety of entities including the Nature Conservancy, the Black Hawk County Conservation Board (BHCCB), the Iowa Natural Heritage Foundation, the Iowa DNR, and private landowners.

Being situated on an old railroad bed, one might infer that although highly fragmented and reduced, this area could harbor remnant native vegetation because it has remained untilled over the centuries and decades since settlement. Indeed remnant vegetation exists, and perpetuating and enhancing that remnant component to the trail is one of the main goals of this restoration management plan. The BHCCB has attempted to restore certain areas to prairie vegetation along the trail before too, but without regular maintenance and coordination of said maintenance this area has become severely degraded. By enhancing these two areas and others along the CVNT we can increase biodiversity and enhance the recreation experience for tail users of all types, the main goal of this management plan. In addition to the native plant species of the prairie, some elements of floodplain forest exist along the CVNT. This mix of successional stages and habitat types makes the CVNT a prime spot for birding. The large amount of diverse habitat types along the Cedar River provides a corridor for movement of migrant and nesting species. Because of this, the CVNT has been designated by the Audubon Society as a habitat corridor for nesting and migrant bird species, and deemed an excellent birding site. Managing for structural heterogeneity (many different vegetation types, densities, heights, etc.), not only prairie species, is an important part of this management plan.

2.4 Abiotic Characteristics

2.4.1 CVNT Geological Characteristics

The geology of the CVNT is typically that of the Cedar River in this section. The bedrock was formed in the Devonian Era, and is comprised of the Wapsipinicon formation and Cedar Valley Group, both dolomites and limestones. Lying in the river valley, most of the soil along the CVNT is the Finchford and Flagler soil complexes, both excessively drained alluvium-derived soils. The USDA NRCS Soil Survey of Blackhawk County states that the top horizons of these series are sandy loams, explaining the persistence of drier prairie species along the CVNT. Soil series summaries for the Finchford and Flagler complexes can be found in **Appendix B**. A map of this whole section of the CVNT w/ soil layers is incredibly hard to read (because the trail is linear over a relatively large area), and thus was not included in this plan on paper, but is available on the Iowa Department of

Natural Resources Geographic Information Systems Library, http://www.igsb.uiowa.edu/nrgislibx/, or using the NRCS Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm/). The GIS file from the DNR GIS Library will be included in the GIS CD for this management plan.

2.4.2 Hydrologic Characteristics

The CVNT is positioned within the Cedar River floodplain. Because rivers are dynamic systems, it should not be forgotten that oxbow lakes will come and go in the area, even on the west side of the trail. Portions of the floodplain near the trail experience annual flooding, and greater than half of the trail was submerged during the floods of 2008. During the floods of 2008, a large section of the trail was blown out by the river, and was reconstructed in 2009 using large rock and soil as a foundation. Keeping these facts in mind will be important for long term management of the CVNT.

2.4.3 Active Use Areas

The entire CVNT is used recreationally, typically by bikers, walkers, and rollerbladers. Also, a local snow mobile club has been granted access to use the trail in the winter months. It should be noted here that although the trail itself is paved, this does not mean that trail users will only stay on the trail. One example of this is Schaefer's Natural Area, south of the Gazebo. With the passing of the "Open Carry" gun laws, it is likely that pheasant hunters will use Schaefer's Natural Area for hunting. Hunting here will likely be restricted to the fall (during season), but during that time of year it would not be uncommon to see persons in blaze orange walking the trail to the Schaefer's Natural Area access point.

2.5 Biotic Characteristics

No official floral or faunal surveys have been completed for this section of the CVNT. The species found along the trail are typical of prairie systems of various moisture regimes, and of flood plain forests. Good estimates of plant communities are included below, as with notable species of

concern. All specific species listed we observed casually in the fall of 2010. More precise lists of bird species can be found in **Appendix C, table 1**.

2.5.1 Flora

From examining aerial photographs (**Appendix A, figures 1 and 2**), it can be inferred that the CVNT was once a more open prairie or grassland ecosystem, and that over time tree species such as Eastern cottonwood (*Populus deltoides*) and the exotic Siberian elm (*Ulmus pumula*) have successfully closed in on many areas. A few small (approximately 2 acre) prairie remnants exist. As a reference site for the restoration and enhancement of these areas, Cedar Hills Sand Prairie, was chosen as suitable based on its proximity (<30mi), and similar soil types (sandy loam). The seed mixes selected for the two restored sites (Prairie Remnant Area and Prairie Enhancement Area) contain some of the same species, but certainly not all or only the species found in Cedar Hills Sand Prairie.

The prairie species remaining in these remnants typically aren't too conservative, i.e. they would not score highly on Floyd Swink's coefficient of conservatism scale. These include indiangrass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), evening primrose (*Oenothera parviflora*), asters (*aster spp.*), indigo (*Baptisia spp.*), Canada wild rye (*Elymus canadensis*), prairie bush clover (*Lezpedeza capitata*), and rough blazing star (*Liatris aspera*), to name a few. These and others are visible in the prairie remnant area and the gazebo enhancement area. Prairie species do exist in small numbers in other parts along the CVNT. Sites other than the two named above where prairie species exist would be the prairie enhancement area, and Schaefer's Natural Area, both reconstructions (BHCCB and WRP, respectively).

Another species to note that exists on the south half of the CVNT in this section is the glade mallow (*Napaea diocia*), which has been listed on the Iowa State Endangered Species list before (Van Norman 1987). It should be noted that this species at that time could only be found in Winneshiek, Allamakee, Blackhawk, Butler and Howard counties. Currently the species distribution is listed as those counties along with Floyd and Fayette (Eilers and Roosa), growing in most, alluvial woods. On the CVNT, it can be found just north and south of the gazebo area, mostly on the east side of the trail. It is a shade tolerant species that benefits from moderately frequent disturbances (Iltis 1963), such as brush cutting and vegetation removal underneath the MidAmerican utility line. Other

common early succesional common floodplain species growing along the CVNT include hackberry (*Celtis occidentalis*), mulberry (*Morus rubra*), and others, both woody and herbaceous.

Many non-native plant species have moved into the area. To name them all would require a floral survey. The most notable exotic species growing along the trail are Siberian elm (*Ulmus pumula*), smooth brome (*Bromus inermis*), reed canary grass (*Phalaris arundinacea*), and foxtail grass (*Alopecurus pratensis*). These species can be found all along the trail.

2.5.2 Fauna

As with plant species along the CVNT, an official faunal survey has not been conducted. From observation of mammal tracks, white-tailed deer (*Odocoileus virginanus*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), and Virginia opossum (*Didelphis virginiana*) frequent the trail and adjacent areas. No observations were made for amphibians or reptiles.

Bird species along the CVNT have been studied and surveyed, and the CVNT has been cited as one of the finest birding spots in Black Hawk County (Shilke 2009). Species last recorded in the Iowa Bird Breeding Atlas can be found in **Appendix C, table 1**. Shilke has observed over 150 species in one outing, over 50 of which he sighted between Gilbertville and the gazebo (Tom Shilke, personal communication). Management decisions of certain areas (gazebo and Shaefer's Natural Area) reflect this designation, and aim to perpetuate and in some cases improve the quality birding along the CVNT.

3 Management Plan

3.1 Goals and Overview

Goals of this management plan:

- Provide high quality experience for recreational trail users
- Increase biodiversity of native plant species
- Maintain structural heterogeneity for avifauna

To orient the reader to the priority management sections of the trail, **figure 2** should be consulted. It displays a map of the section of the CVNT discussed in this management plan, along with each of the priority management areas marked.

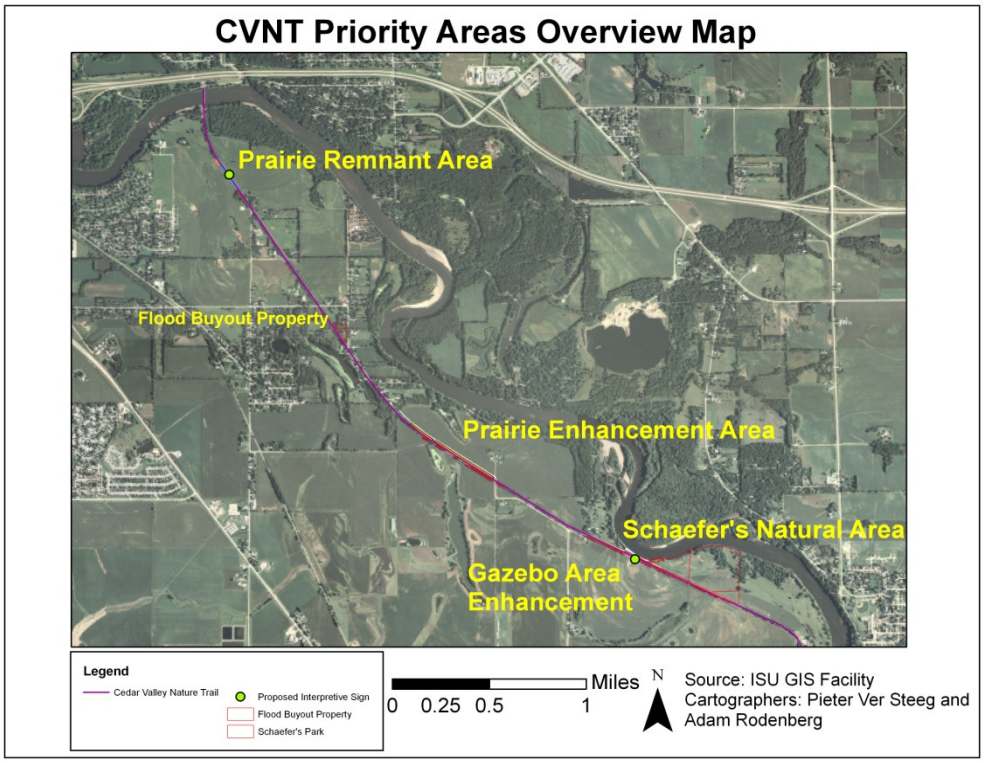


Figure 2. Priority management areas of the CVNT. The total size of the Prairie Remnant Area the Prairie Enhancement Area are 3 acres each. The Gazebo Enhancement Area is approximately 1.8 acres, and Shaefer's Natural Area is 57.54 acres. Detailed maps for each area can be found in **Appendix D, figures 1-4**.

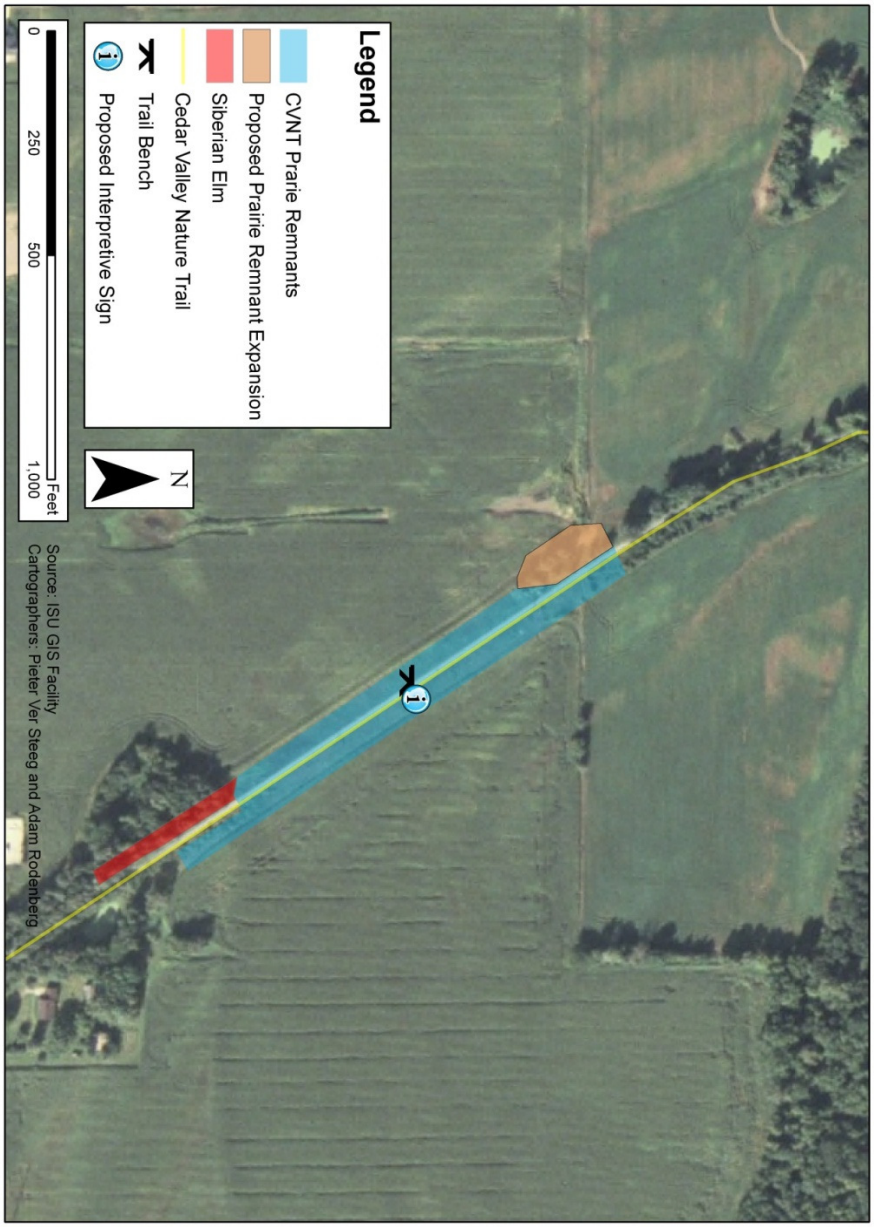
3.2 Description of Tasks

3.2.1 Overall Maintenance

- Ground vegetation should be maintained through mowing, lopping, and trimming at a height of less than 12 inches high and 4 feet on either side of the trail as needed.
- Overhanging branches and tree limps should be trimmed to maintain a structural height of 10 feet.
- Clearing of the trail of brush, limbs, nuts, etc. to keep pavement clean throughout recreational season as needed.

3.2.2 Prairie Remnant Area- Appendix D, figure 1.

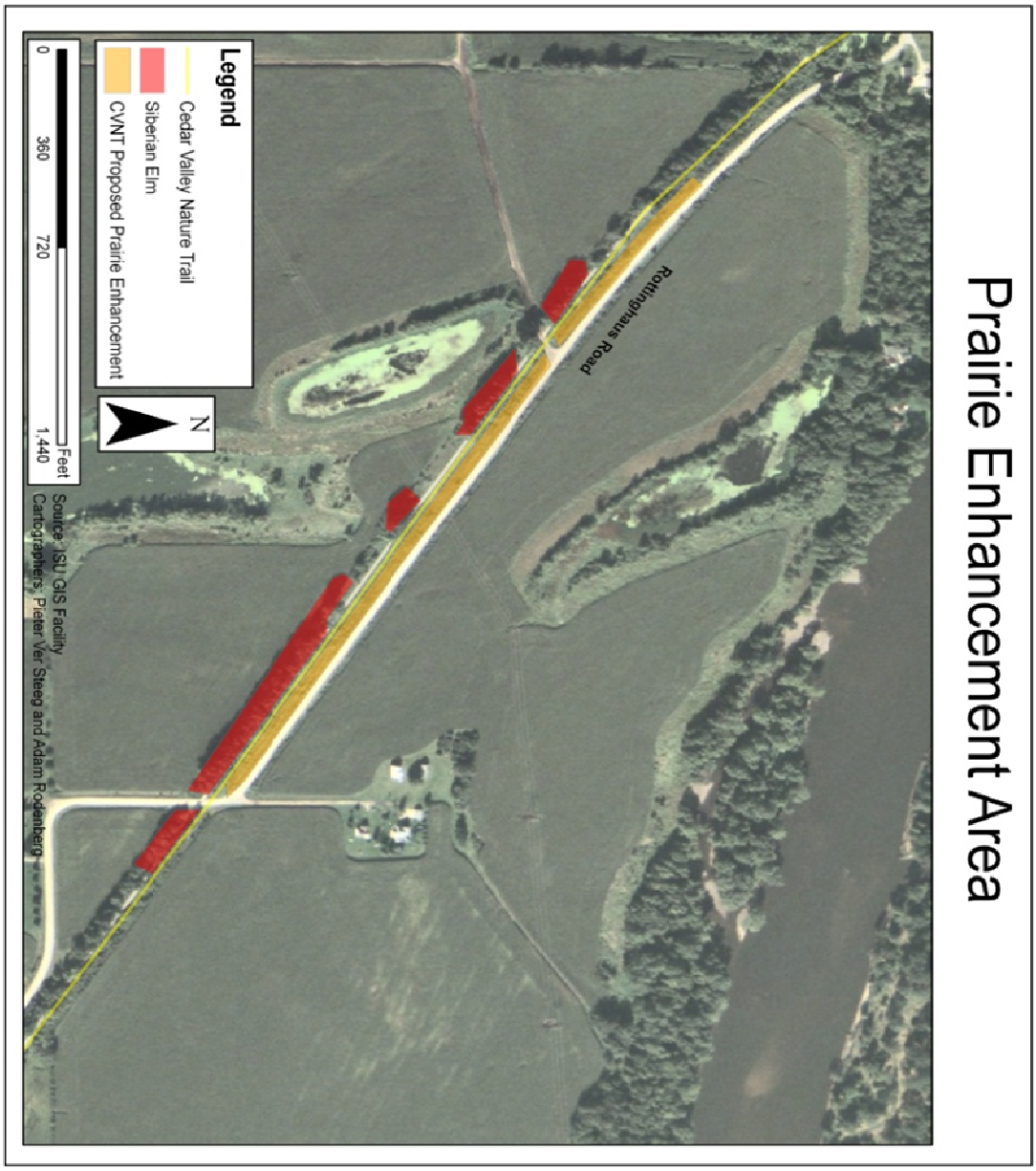
- Removal of woody vegetation in Northwest Corner to expand the remnant prairie.
    - Chainsaw and Tordon RTU (spring/fall)
    - Tree Removal Service
- Removal of woody vegetation in the entirety of the prairie with loppers or chainsaw and treat with Tordon RTU when woody vegetation exceeds 4 feet. Check area annually for invasions.
- Initiate tri-annual burn cycles between fall and spring burns (burn log)



Prairie Remnant Area

3.2.3 Prairie Enhancement Area- Appendix D, figure 2.

- Woody vegetation removal throughout entire management area when woody species exceed 4 feet. Check annually for invasions.
    - Chainsaw, loppers and Tordon RTU (spring/fall)
    - Tree Removal Service to remove large trees
- Over seed with wet prairie mix (**Appendix E, table 2**)
    - Establishment mowing (1st and 2nd growing seasons) (Williams et. al 2009)
- Initiate a tri-annual burn cycle between spring and fall burns.



3.2.4 Gazebo Area Enhancement- Appendix D, figure 3.

This management area is comprised of several separate areas of concern: the gazebo, flood blowout, and bird nesting habitat. Each of these sub-management units in the Gazebo Area consists of separate management issues.

The Gazebo is a recreational structure overlooking the Cedar River that is easily accessible for recreational users. Several native prairie species can be found throughout this area. Over the past several years however, woody vegetation has established around the Gazebo restricting the view of the Cedar River.

- Remove woody vegetation around Gazebo to enhance view of Cedar River. Check every two years for new invasions. Total removal time estimated at 8 hours.
- Initiate a tri-annual burn cycle between spring and fall burning around Gazebo where herbaceous vegetation is established.

The flood blowout section is located directly north of the Gazebo and has been reconstructed with rip-rap to reinforce the trail. Siberian Elm seedlings are raining into the area and are beginning to sprout up in the rip-rap potentially causing weakness in the structure making the area prone to flood damage.

- Removal of Siberian Elm and other woody vegetation growing in rip-rap.
    - Monitor yearly, though wait until 2012 or 2013 to lop and treat.

The final area is the bird nesting habitat which is comprised of early successional species of different ages and heights. The Glade Mallow (*Napaea dioica*) is a rare plant species that is disturbance adapted (Iltis 1963) and can be found throughout this area. This area is extremely difficult to manage because Mid American Energy has an easement on the east side of the trail.

- Removal of Siberian Elm around high quality birding habitat
    - Tree Removal Service to remove large trees on west side of the trail
    - Loppers and Tordon RTU
- Develop and maintain communication with Mid American Energy on management practices.

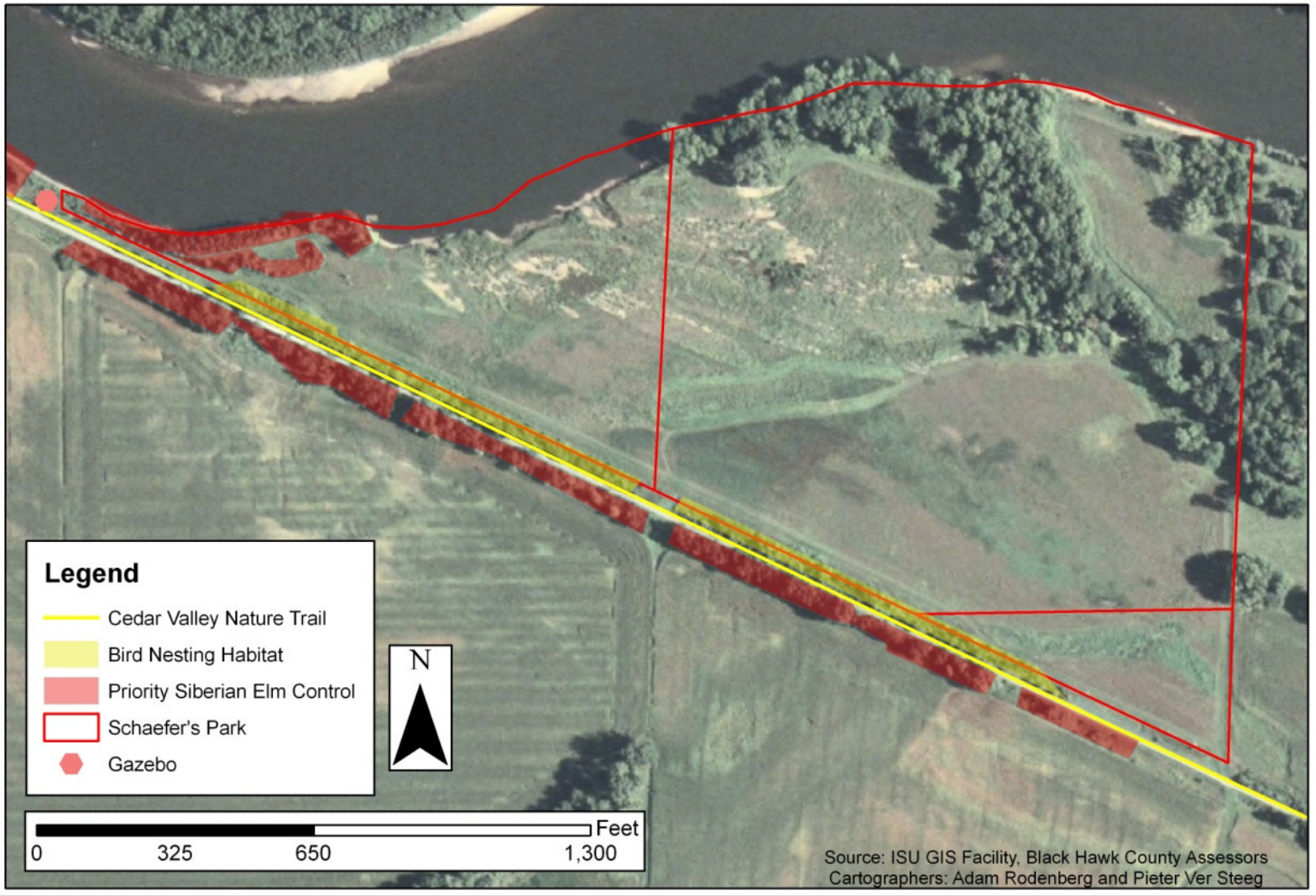
3.2.5 Schaefer's Natural Area- Appendix D, figure 4

Schaefer's Natural Area is a 57.54 acre parcel of land that was previously owned by the Schaefer family. This natural area is located between the CVNT and the Cedar River directly south of the Gazebo. The property has been acquired by the Iowa Natural Heritage Foundation (INHF) and will be bought by the State of Iowa. Once ownership is given to the State, BHCCB will overtake management of the property. The parcel has been named "natural area" due to the fact it will have no amenities that a "park" has including: toilets, mowed pathways, and other structures. The site will be open for recreational uses as well as hunting and fishing.

Schaefer's Natural Area contains approximately 45 acres of Wetland Reserve Program (WRP) comprised of a basic seed mix containing the big five grasses (Big bluestem, Little bluestem, Indiangrass, Canada Wild rye, and Side-oats grama) along with several forbs. The site also contains approximately 15 acres of floodplain forest bordering the Cedar River. The site has had little management applied since the acreage was converted from row crop to WRP but will be consistent with other areas along the CVNT.

- Initiate a tri-annual burn cycle between spring and fall burns on WRP. Ideally small sections of approximately 33% of the area will be burned each year.
    - In late summer 2011, establish mowed fire lanes for burning in fall 2011. Decisions between managers and conservationists at BHCCB will be made in regards to where fire lanes are placed.
- Removal of Siberian elm (if exceeds 4 feet) and other woody vegetation in WRP and on adjacent west side of trail.
    - Loppers and Tordon RTU (spring/fall)
    - Tree Removal Service to remove large trees on west side of trail.
- Close monitoring for invasive species in WRP and floodplain forest annually.

Schaefer's Natural Area



4 Timeline

A rough timeline for the CVNT Management Plan, given it is adopted in the summer 2011, would be as follows:

- Spring 2011
    - PSM-EM group field day in Gazebo Enhancement Area, to take out woody species of "proposed expansion" area in **Appendix D, figure 4.**
    - Design Cedar Trails Partnership signs for installation in late summer or fall 2011.
- Summer 2011
    - Receive CTP signs for installation
- Fall 2011
    - Burn west side of Prairie Remnant Area, burn Prairie Enhancement Area to prep for spring 2012 seeding.
    - Contact and make bids for Prairie Enhancement seed (possibly through Ion Exchange, Prairie Moon Nursery, The Tallgrass Prairie Center, or other native seed producers) and order seed.
    - Make contact with MidAmerican Energy to establish better relationship and facilitate communication between BHCCB and MidAmerican on vegetation removal under utility lines.
    - Contact tree removal companies to contract Siberian elm removal west of Schaefer's Natural Area.
- Winter 2011/2012
    - Monitor all priority sites for Siberian elm and remove where growing ≥ 4ft.
- Spring 2012
    - After artificially cold-stratifying seed for Prairie Enhancement Area, plant the area using BHCCB seed drill. If seed drill will not maneuver into area because of topography of the ditch, broadcasting seed, either by hand or tool, would be acceptable. This will ideally be completed in March, after snowmelt and soil frost line has thawed.
- Summer 2012 and 2013

    - Initiate establishment mowing on a monthly basis on Prairie Enhancement Area from May-September, as recommended by Williams et al. (2009).
- Fall or Winter 2012
    - Burn Prairie Remnant Area, and continue burning all areas on a 3 yr or so basis.
    - Monitor all sites for Siberian elm and remove where growing ≥ 4ft.
- Fall 2013
    - Burn appropriate areas, monitor for Siberian elm. If significant prairie species have been outcompeted of the Prairie Remnant Area, overseeding could be initiated using seed mix in **Appendix E**.
    - Order seed, cold stratify and perform establishment mowing in a similar fashion as on the Prairie Enhancement Area.

This only represents a rough timeline, and changes may have to occur as a result of schedules, funds, etc. If adopted in 2012, for instance, all management activities should be pushed back 1 year.

5 Acknowledgements

We want to first thank BHCCB for their financial support on this project. It has been a great experience working with all the board members, Vern Fish, Jim Weimer, Al Fink and Leon Lindley. Thank you also to Tom Shilke for his input on birding on the CVNT. There are numerous others we would like to thank for their support as resources and guidance throughout this project, namely Dr. Laura Jackson, Dr. Mark Myers, and Dave Williams of the Tallgrass Prairie Center.

6 Literature Cited

Carlson, Norman. *Iowa Trolleys*. Chicago: Central Electric Railfans' Association, 1975. Print.

Corwin, Margaret, and Helen Hoy. *Waterloo- a Pictoral History*. Rock Island, Ill.: Quest, 1983. Print.

Eilers, Lawrence J., and Dean M. Roosa. *Plants of Iowa*. Web. 22 Apr. 2011. <www.plantsofiowa.com>.

Fish, Vern. 2009. *The Pathway: 3-5 Year Strategic Plan.* Black Hawk County Conservation Board.

Iltis, Hugh H. 1963. *Napaea Dioica (Malvaceae): Whence Came the Type?* American Midland Naturalist 70: 1, pgs 90-109.

Jackson, David R., and J.C. Finely. 2007. *Herbecides and Forest Vegetation Management.* The Pennsylvania State University Press.

Shilke, Tom. 2009. *Birding Blackhawk County*. Iowa Bird Life 79:4. Pgs 216-222.

Shilke, Tom. Personal communication. 2010. Depot at Gilbertville, IA.

Smith, Daryl. 1990. *Tallgrass Prairie Settlement: Prelude to Demise of the Tallgrass Ecosystem.* Proceedings of the Twelfth North American Prairie Conference, 195-200.

Smith, Daryl, D. Williams, G. Houseal, and K. Henderson. 2010. *The Tallgrass Prairie Center Guide to Prairie Restoration in the Upper Midwest.* Iowa City, Iowa. University of Iowa Press.

USDA NRCS. 2009. Web Soil Survey. http://www.websoilsurvey.nrcs.usda.gov/ Accessed online. 1 Dec. 2010.

USDA NRCS. 2001. Soil Survey for Blackhawk County, Iowa. http://soildatamart.nrcs.usda.gov/Manuscripts/IA013/0/BlackHawk_IA.pdf Accessed online. 1 Dec. 2010.

Weimer, Jim. Personal communication. 2010. Blackhawk County Conservation Board, 1346 West Airline Hwy, Waterloo, IA 50703.

Williams, Dave, L. Jackson and D. Smith. 2007. *The Effects of Frequent Mowing on Survival and Persistence of Forbs in a Species Poor Grassland.* Restoration Ecology 15: 1. Pg 24-33.

Van Norman, Karen. 1987. A *Survey of the Vascular Flora of Blackhawk County, Iowa.* Thesis Dissertation, University of Northern Iowa.

Appendix A. Historical Maps.

Figure 1. Total extent of Cedar Valley Road, from Norman 1975.

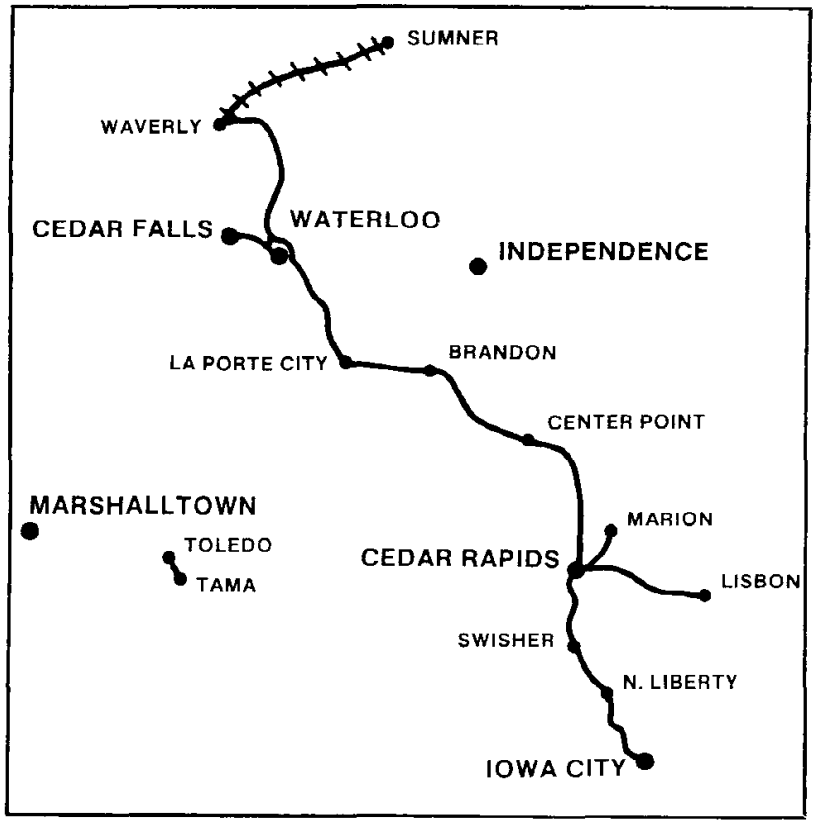


Figure 2. 1930's Aerial Photograph of CVNT near Evansdale. Note absence of trees along trail, and soil patterns in fields indicating where the Cedar River has run previously. Entire trail photograph available at ISU GIS Facility website. This northern section is used to observe detail.

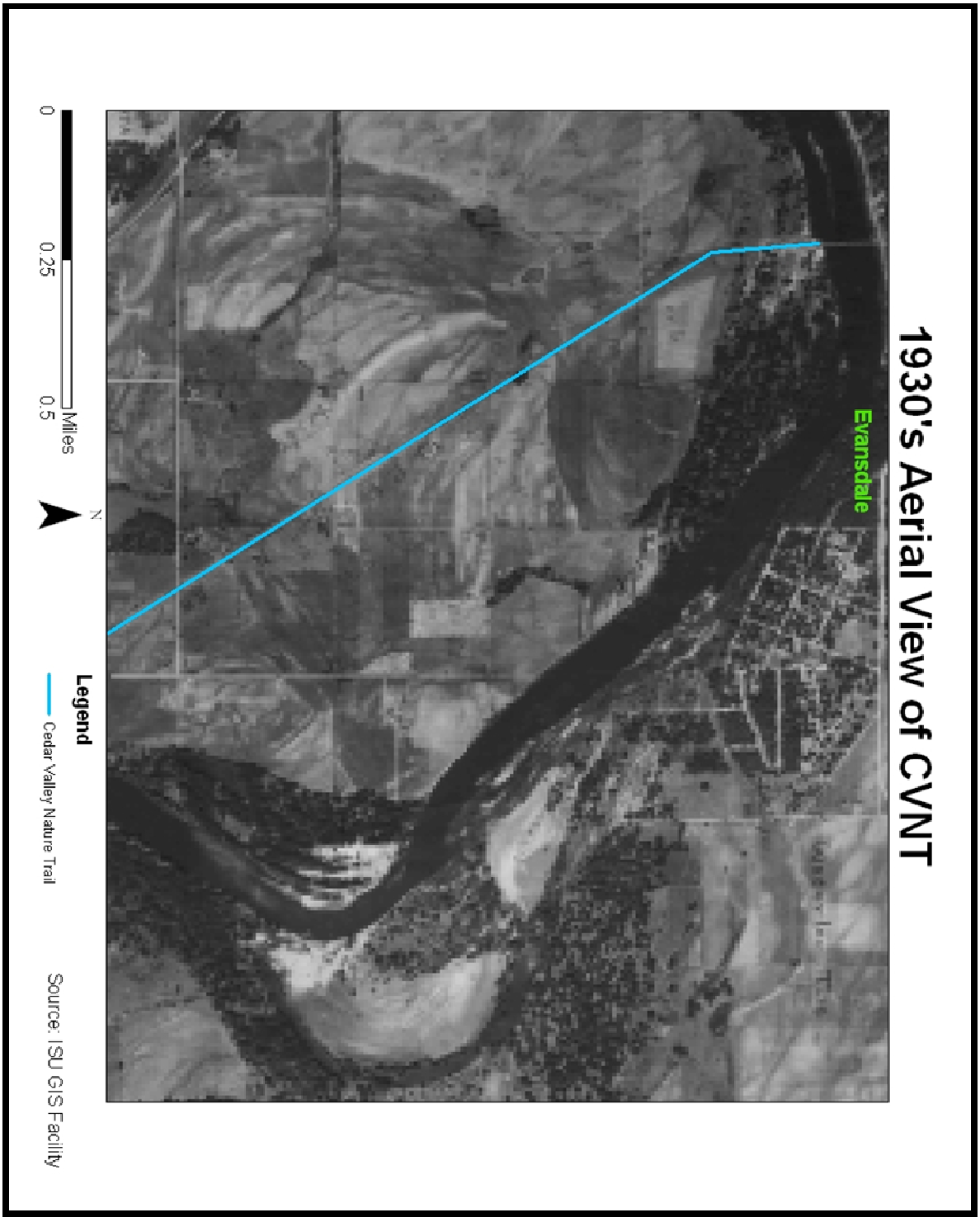


Figure 3. 2008 Aerial Photograph of CVNT. Note tree encroachment along trail and urbanization of the area. Northern section used to observe detail and compare to **Figure 2.**

Appendix B. Soil Survey Information for Flagler and Finchford Complexes

Flagler Soil Summary:

Ap—0 to 8 inches; very dark brown (10YR 2/2) sandy loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; common fine roots; common fine interstitial and tubular pores; slightly acid; abrupt smooth boundary.
A—8 to 20 inches; very dark grayish brown (10YR 3/2) and very dark brown (10YR 2/2) sandy loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; common fine roots; common fine interstitial and tubular pores; moderately acid; clear smooth boundary.
Bw—20 to 28 inches; brown (10YR 4/3) and dark brown (10YR 3/3) sandy loam; weak fine granular structure; friable; common fine roots; common fine interstitial and tubular pores; moderately acid; clear smooth boundary.
2BC—28 to 35 inches; dark yellowish brown (10YR 4/4 and 3/4) loamy sand; weak fine granular structure; very friable; common fine roots; common fine interstitial and tubular pores; moderately acid; clear smooth boundary.
2C1—35 to 42 inches; light yellowish brown (10YR 6/4) and brownish yellow (10YR 6/6) sand; single grain; loose; about 5 percent subrounded mixed gravel; moderately acid; gradual smooth boundary.
2C2—42 to 80 inches; light yellowish brown (10YR 6/4) and brownish yellow (10YR 6/6) gravelly coarse sand; single grain; loose; about 30 percent subrounded mixed gravel; slightly acid.

Range in Characteristics:

Thickness of the mollic epipedon: 12 to 24 inches. Depth to sandy material: 20 to 36 inches
Ap and A horizons: Hue—10YR, Value—2 or 3, Chroma—1 or 2, Texture—sandy loam or fine sandy loam
Bw horizon: Hue—10YR or 7.5YR**,** Value—3 to 5**,** Chroma—3 to 6**,** Texture—sandy loam
2BC horizon: Hue—10YR or 7.5YR**,** Value—3 to 5**,** Chroma—4 to 6**,** Texture—loamy sand or sand
2C horizon: Hue—10YR**,** Value—4 to 6**,** Chroma—4 to 6**,** Texture—loamy sand, sand, or coarse sand or the gravelly analogs of these textures

Finchford Soil Summary:

Ap—0 to 8 inches; very dark brown (10YR 2/2) loamy sand, dark grayish brown (10YR 4/2) dry; weak fine granular structure parting to single grain; very friable; common very fine and fine roots; about 4 percent fine gravel; neutral; clear smooth boundary.
A1—8 to 18 inches; very dark grayish brown (10YR 3/2) loamy sand, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to single grain; very friable; common very fine roots; about 8 percent fine gravel; slightly acid; clear smooth boundary.
A2—18 to 30 inches; dark brown (7.5YR 3/2) sand, brown (7.5YR 5/2) dry; single grain; loose; about 12 percent fine gravel; strongly acid; gradual smooth boundary.
C1—30 to 55 inches; brown (7.5YR 4/4) gravelly coarse sand; single grain; loose; about 20 percent fine gravel; moderately acid; gradual smooth boundary.
C2—55 to 70 inches; pale brown (10YR 6/3) coarse sand; single grain; loose; about 10 percent fine gravel; moderately acid; gradual smooth boundary.
C3—70 to 80 inches; pale brown (10YR 6/3) gravelly coarse sand; single grain; loose; about 16 percent fine gravel; moderately acid. Black Hawk County, Iowa 91

Range in Characteristics:

Thickness of the mollic epipedon: 10 to 34 inches
Ap and A horizons: Hue—10YR or 7.5YR**,** Value—2 or 3**,** Chroma—1 or 2**,** Texture—loamy sand, sand, or sandy loam
Bw horizon (if it occurs): Hue—10YR or 7.5YR**,** Value—3 to 5**,** Chroma—2 or 3**,** Texture—sand, coarse sand, loamy coarse sand, or loamy sand or the gravelly analogs of these

textures
C horizon: Hue—7.5YR or 10YR**,** Value—3 to 6**,** Chroma—3 to 6**,** Texture—coarse sand, sand, gravelly coarse sand, or gravelly sand**.**

Appendix C. Bird Species List

Table 1. Bird Species of the Gilbertville Section of the Iowa Breeding Bird Atlas. Complete list of the state available at: http://bba.iowabirds.org/

Accipitridae: Red-tailed Hawk, Red-shouldered Hawk
Alaudidae: Horned Lark
Anatidae: Wood Duck
Ardeidae: Great Blue Heron
Bombycillidae: Cedar Waxwing
Cathartidae: Turkey Vulture
Cardinalidae: Northern Cardinal, Rose-breasted Grosbeak, Dickcissel, Indigo Bunting
Charadriidae: Killdeer
Columbidae: Mourning Dove
Corvidae: Blue Jay, American Crow
Cuculidae: Yellow-billed Cuckoo
Emberizidae: Chipping Sparrow, Field Sparrow, Lark Sparrow, Savannah Sparrow, Grasshopper Sparrow, Song Sparrow
Fringillidae: House Finch, American Goldfinch
Falconidae: American Kestrel
Hirundinidae: Bank Swallow, Cliff Swallow
Icteridae: Common Grackle, Brown-headed Cowbird, Orchard Oriole, Baltimore Oriole, Eastern
Mimidae: Gray Catbird, Brown Thrasher
Paridae: Black-capped Chickadee
Parulidae: Yellow Warbler, American Redstart, Common Yellowthroat, Meadowlark, Red-winged Blackbird
Passeridae: House Sparrow
Picidae: Northern Flicker, Downy Woodpecker, Red-bellied Woodpecker, Red-headed Woodpecker
Polioptilidae: Blue-gray Gnatcatcher
Sittidae: White-breasted Nuthatch
Sturnidae: European Starling
Troglodytidae: House Wren, Sedge Wren
Turdidae: Eastern Bluebird, Wood Thrush, American Robin
Tyrannidae: Great Crested Flycatcher, Eastern Kingbird, Willow Flycatcher, Eastern Wood-Pewee
Vireonidae: Bell's Vireo, Warbling Vireo

Appendix D. Maps of Priority Management Areas

Figure 1. Prairie Remnant Area Management Map. Trail bench noted for reference, as is proposed placement of a new CTP Prairie Pathways informational sign.

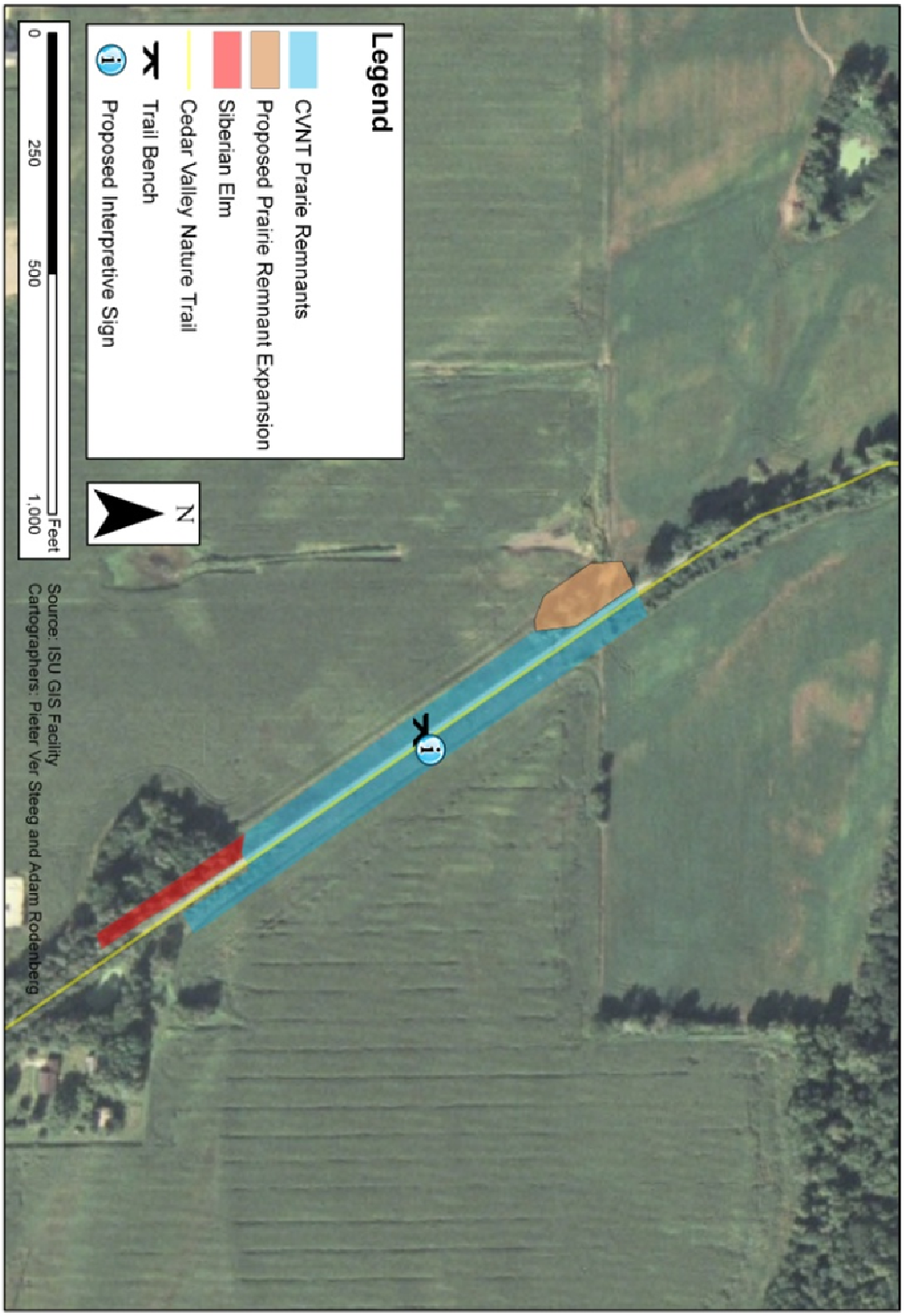


Figure 2. Prairie Enhancement Area Management Map.

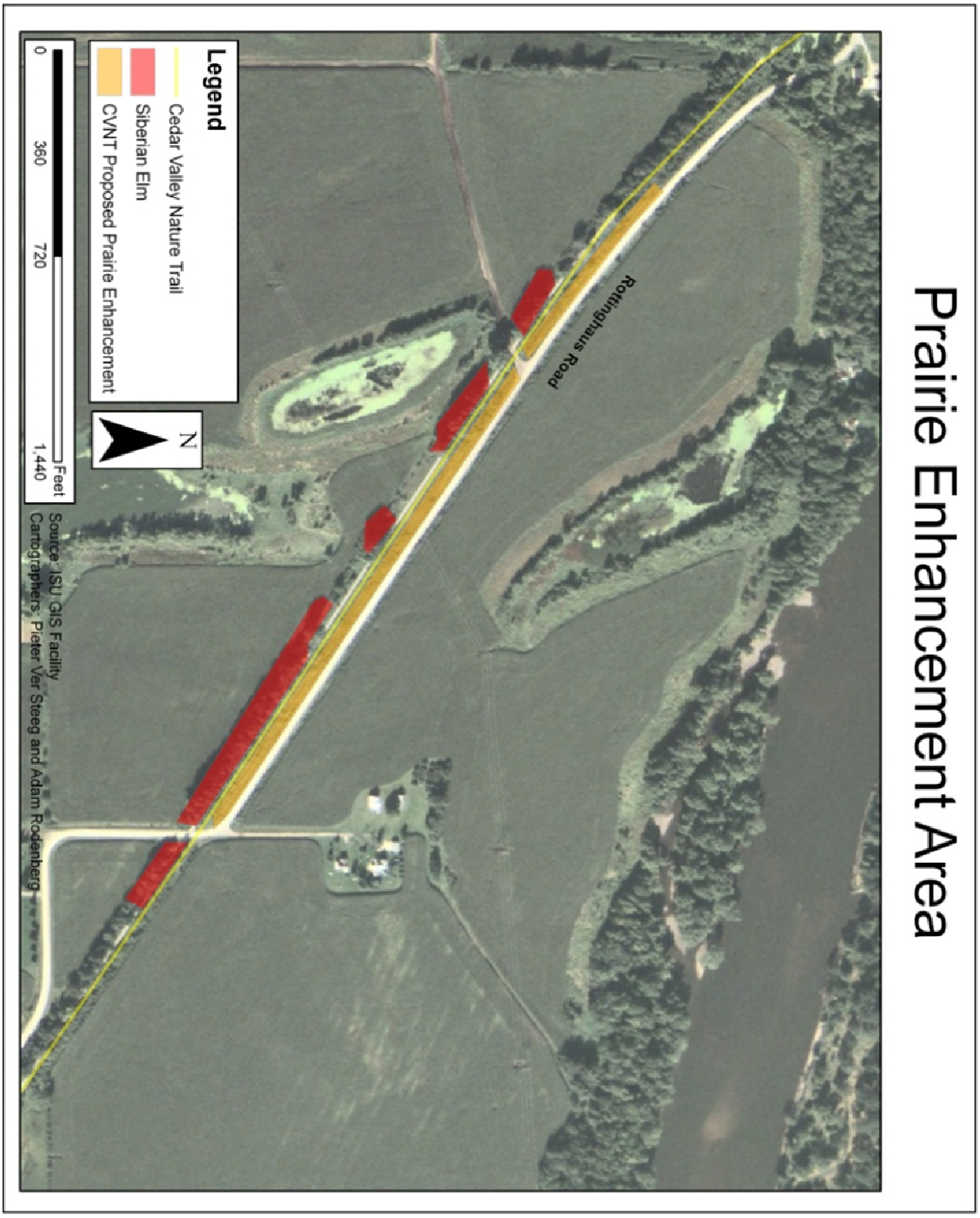


Figure 3. Gazebo Area Management Map. Note placement of proposed interpretive sign for birding habitat along the CVNT, paid for with a grant from CTP.

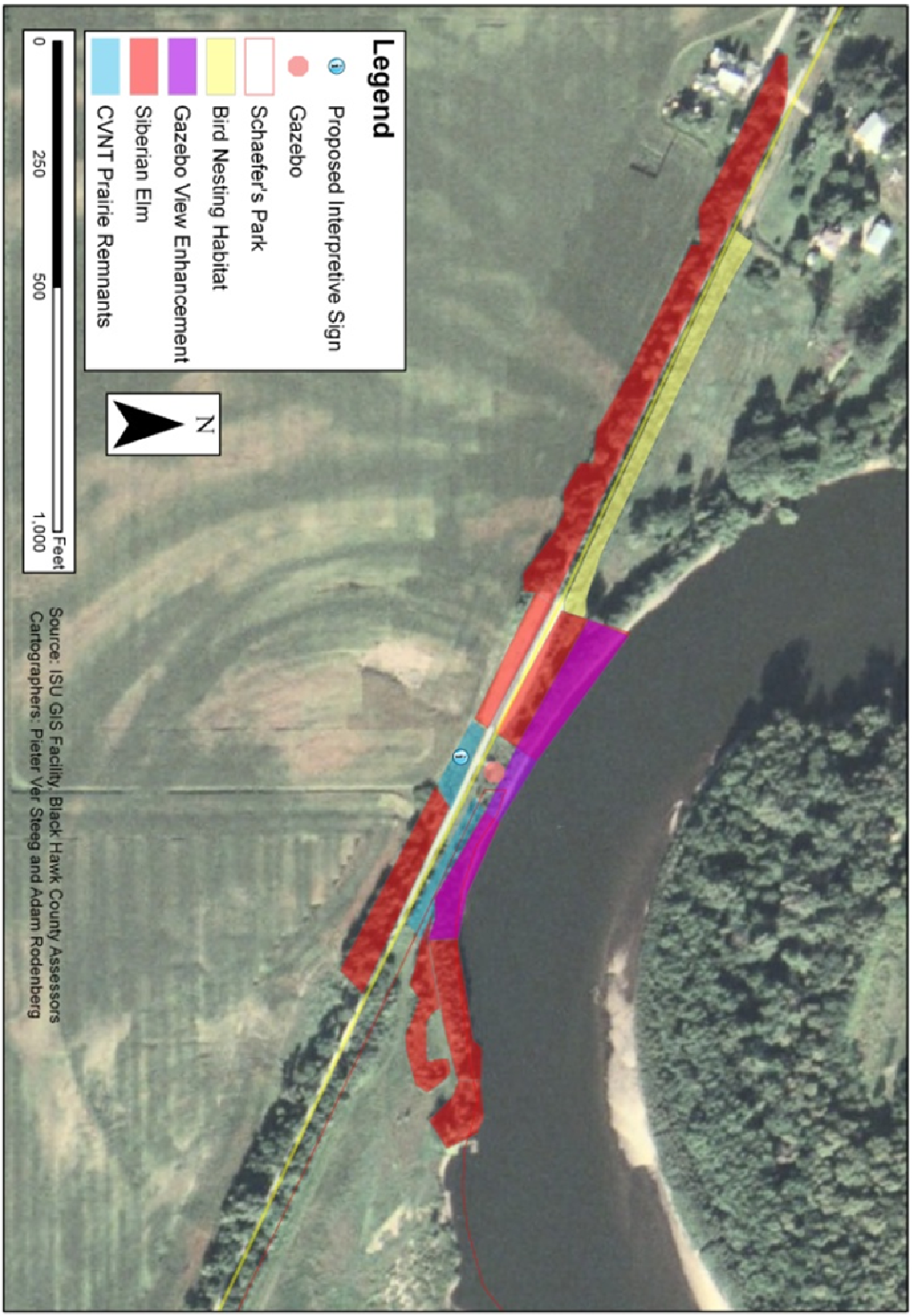
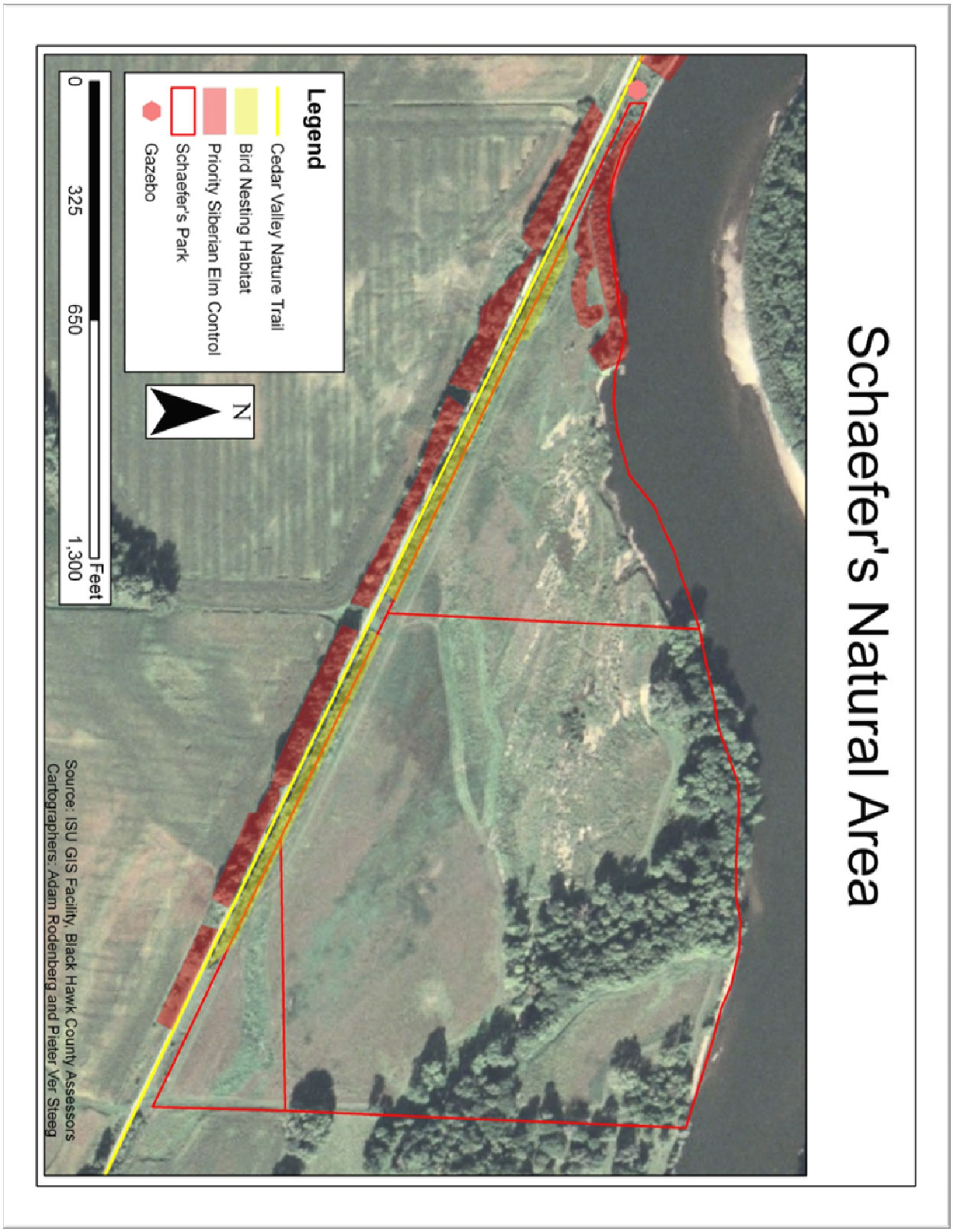


Figure 4. Schaefer's Natural Area.



Appendix E. Example Seed Mixes for Enhancement Areas

Table 1. Over Seed Mix for Prairie Remnant Area. Note emphasis on cool season grasses, and forbs. Over seed mix: <40 seeds/ft^2 (35.3) for ~3 acres. A collection of suggested species to include.

Grasses	**Scientific Name**	**Seeds/Oz.**	**Seeds/Square Foot**	**RATE(0z PLS)**	**COST(2009)**
Western Wheatgrass	*Agropyron smithii*	7000	0.5	7.8	$23.34
Slender Wheatgrass	*Agropyron trachycaulum*	6900	0.5	7.9	$15.78
Big Bluestem	*Andropogon gerardii*	10000	0.5	5.4	$10.89
Side-oats Grama	*Bouteloua curtipendula*	8650	0.5	6.3	$12.59
Prairie Brome	*Bromus kalmii*	8000	0.5	6.8	$13.61
Blue Joint Grass	*Calamagrostis canadensis*	248880	1	0.4	$26.25
Copper-shoulder oval sedge	*Carex bicknellii*	17000	1	6.4	$64.06
Plains oval sedge	*Carex brevior*	29000	0.5	1.9	$18.78
Long-awned bracted sedge	*Carex gravida*	12000	0.5	4.5	$36.30
Field oval sedge	*Carex molesta*	25000	0.5	2.2	$32.67
Brown Fox sedge	*Carex vulpinoidea*	100000	1	1.1	$13.07
Canada Wildrye	*Elymus canadensis*	6200	0.5	8.8	$17.56
Virginia Wild Rye	*Elymus virginicus*	4200	0.7	18.2	$36.30
June Grass	*Koeleria macrantha*	400000	0.5	0.1	$1.36
Indian Grass	*Sorghastrum nutans*	11500	0.5	4.7	$14.20
Prairie Cordgrass	*Spartina pectinata*	6040	0.5	9.0	$72.12
Prairie Dropseed	*Sporobolus heterolepis*	15000	0.3	2.2	$32.67
		TOTAL(grass)	10.0	93.7	$441.56
Forbs (Legumes)	**Scientific Name**	**Seeds/Oz.**	**Seeds/Square Foot**	**RATE(0z PLS)**	**COST(2009)**
Leadplant	*Amorpha canescens*	17884	1	6.1	$73.07
Milk Vetch	*Astragalus canadensis*	17000	1	6.4	$38.44
Ground Plum	*Astragalus crassicarpus*	5200	0.1	2.1	$62.83
White Wild Indigo	*Baptisia alba*	1700	0	0.0	$0.00
Cream False Indigo	*Baptisia bracteata*	1400	0.02	1.6	$93.34
Partridge Pea[1]	*Chamaecrista fasiculata*[1]	2700	0.05	2.0	$6.05
Purple Prairie Clover	*Dalea purpurea*	15000	2	14.5	$43.56

Showy Tick Trefoil	*Desmodium canadense*	5500	0	0.0	$0.00
Illinois Tick Trefoil	*Desmodium illinoense*	4300	0.1	2.5	$37.99
Licorice Root	*Glycyrrhiza lepidota*	3900	0	0.0	$0.00
Round-Headed Bush Clover	*Lespedeza capitata*	8000	0.5	6.8	$81.68
Prairie Turnip	*Psoralea esculenta*	1100	0	0.0	$0.00
		TOTAL(legume)	**4.8**	**42.0**	**$436.95**
Forbs (Non-Legumes)	**Scientific Name**	**Seeds/Oz.**	**Seeds/Square Foot**	**RATE(0z PLS)**	**COST(2009)**
Canada Anemone	*Anemone canadensis*	8000	0.1	1.4	$27.23
Pasque Flower	*Anemone patens*	18000	0.1	0.6	$60.50
Prairie Sage	*Artemisia ludoviciana*	250000	1	0.4	$13.07
Rattlesnake Master	*Erynigium yuccifolium*	7500	0.25	3.6	$29.04
Sneezeweed	*Helenium autumnale*	130000	1	0.8	$5.03
Bigtooth Sunflower	*Helianthus grosseserratus*	15000	0.1	0.7	$21.78
Rough Blazingstar	*Liatris aspera*	16000	0.5	3.4	$68.06
Prairie Blazingstar	*Liatris pycnostachya*	11000	0.1	1.0	$14.85
Great Blue Lobelia	*Lobelia siphilitica*	500000	1	0.2	$4.36
Wild Bergamot	*Monarda fistulosa*	70000	0.5	0.8	$7.78
Foxglove Beardtongue	*Penstemon digitalis*	130000	1	0.8	$4.19
Prairie Phlox	*Phlox pilosa*	19000	0.2	1.1	$68.78
Prairiie Cinquefoil	*Potentilla arguta*	230000	1	0.5	$4.73
Common Mt. Mint	*Pycnanthemum virginianum*	220000	1	0.5	$14.85
Compass Plant	*Silphium laciniatum*	660	0.01	1.7	$16.50
Showy Goldenrod	*Solidago speciosa*	95000	1	1.1	$22.93
Heath Aster	*Symphyotrichum ericoides*	200000	1	0.5	$32.67
Smooth Blue Aster	*Symphyotrichum laeve*	55000	1	2.0	$23.76
New England Aster	*Symphyotrichum novae-angliae*	66000	0.5	0.8	$18.15
Sky-blue Aster	*Symphyotrichum oolentangiense*	80000	1	1.4	$10.89
Flat-topped Aster	*Symphyotrichum umbellata*	67000	1	1.6	$32.51
Germander	*Teucrium canadense*	20000	0.5	2.7	$32.67
Purple Meadow Rue	*Thalictrum dasycarpum*	11000	0.1	1.0	$10.40

Prairie Spiderwort	*Tradescantia bracteata*	10000	0.3	3.3	$65.34
Ohio Spiderwort	*Tradescantia ohiensis*	8000	0.3	4.1	$81.68
Blue Vervain	*Verbena hastata*	93000	3	0.4	$1.76
Hoary Vervain	*Verbina stricta*	28000	1	3.9	$19.45
Heartleaf Alexanders	*Zizia aptera*	12000	1	9.1	$226.88
		TOTAL(forb-nonlegume)	19.6		$939.80
		TOTAL(forb-legume)	4.8		$436.95
		TOTAL (grass)	10.0		$441.56
		Total Seeds/ ft^2	**34.3**		**$1,818.31**

Table 2. Seed Mix for Prairie Enhancement Area and Schaefer's Natural Area. Note emphasis on wet and cool season species. Total = 40.2 seeds/ft^2 for 3 acres. A collection of suggested species.

Grasses	Scientific Name	Seeds/Oz.	Seeds/Square Foot	RATE(0z PLS)	COST(2009)
Western Wheatgrass	*Agropyron smithii*	7000	1	18.7	$56.01
Slender Wheatgrass	*Agropyron trachycaulum*	6900	1	18.9	$37.88
Big Bluestem	*Andropogon gerardii*	10000	0.5	6.5	$13.07
Prairie Brome	*Bromus kalmii*	8000	1	16.3	$32.67
Blue Joint Grass	*Calamagrostis canadensis*	248880	0.1	0.1	$3.15
Yellow Fox Sedge	*Carex annectens*	90000	0.5	0.7	$14.52
Copper-shoulder oval sedge	*Carex bicknellii*	17000	0.5	3.8	$38.44
Plains oval sedge	*Carex brevior*	29000	1	4.5	$45.06
Long-awned bracted sedge	*Carex gravida*	12000	1	10.9	$87.12
Field oval sedge	*Carex molesta*	25000	0.5	2.6	$39.20
Brown Fox sedge	*Carex vulpinoidea*	100000	0.5	0.7	$7.84
Canada Wildrye	*Elymus canadensis*	6200	1	21.1	$42.15
Virginia Wild Rye	*Elymus virginicus*	4200	1	31.1	$62.23
June Grass	*Koeleria macrantha*	400000	1	0.3	$3.27
Switchgrass	*Panicum virgatum*	16000	1	8.2	$24.50
Prairie Cordgrass	*Spartina pectinata*	6040	0.5	10.8	$86.54
Prairie Dropseed	*Sporobolus heterolepis*	15000	0.5	4.4	$65.34

		TOTAL(grass)	12.6	159.6	$658.99
Forbs (Legumes)	**Scientific Name**	**Seeds/Oz.**	**Seeds/Square Foot**	**RATE(0z PLS)**	**COST(2009)**
Leadplant	*Amorpha canescens*	17884	0.1	0.7	$8.77
Milk Vetch	*Astragalus canadensis*	17000	1	7.7	$46.12
Partridge Pea[1]	*Chamaecrista fasiculata*[1]	2700	0.5	24.2	$72.60
White Prairie Clover	*Dalea candida*	19000	1	6.9	$27.51
Purple Prairie Clover	*Dalea purpurea*	15000	1	8.7	$26.14
Showy Tick Trefoil	*Desmodium canadense*	5500	0.1	2.4	$23.76
Illinois Tick Trefoil	*Desmodium illinoense*	4300	0.05	1.5	$22.79
		TOTAL(legume)	**3.8**	**52.1**	**$227.69**
Forbs (Non-Legumes)	**Scientific Name**	**Seeds/Oz.**	**Seeds/Square Foot**	**RATE(0z PLS)**	**COST(2009)**
Wild Garlic	*Allium canadense*	8398	0.5	7.8	$77.80
Canada Anemone	*Anemone canadensis*	8000	0.3	4.9	$98.01
Pasque Flower	*Anemone patens*	18000	0.05	0.4	$36.30
Prairie Sage	*Artemisia ludoviciana*	250000	1	0.5	$15.68
Swamp Milkweed	*Asclepias incarnata*	4800	0.1	2.7	$40.84
Butterfly Milkweed	*Asclepias tuberosa*	4300	0.05	1.5	$22.79
Whorled Milkweed	*Asclepias verticillata*	11000	0.05	0.6	$35.64
Prairie Indian Plantain	*Cacalia plantaginea*	4700	0.1	2.8	$111.22
Rattlesnake Master	*Erynigium yuccifolium*	7500	0.5	8.7	$69.70
Grass-leaved Goldenrod	*Euthamia graminifolia*	350000	1	0.4	$29.87
Bottle Gentian	*Gentiana andrewsii*	280000	1	0.5	$18.67
Sneezeweed	*Helenium autumnale*	130000	1	1.0	$6.03
Alumroot	*Heuchera richardsonii*	700000	0.5	0.1	$3.73
False Boneset	*Kuhnia eupatoriodes*	32000	1	4.1	$40.84
Rough Blazingstar	*Liatris aspera*	16000	0.5	4.1	$81.68
Prairie Blazingstar	*Liatris pycnostachya*	11000	0.5	5.9	$89.10
Great Blue Lobelia	*Lobelia siphilitica*	500000	1	0.3	$5.23
Winged Loosestrife	*Lythrum alatum*	3000000	1	0.0	$3.48
Wild Bergamot	*Monarda fistulosa*	70000	1	1.9	$18.67
Dotted Mint	*Monarda punctata*	90000	1	1.5	$17.42
Wild Quinine	*Parthenium integrifolium*	7000	0.5	9.3	$112.01

Slender Mt. Mint	*Pycnanthemum tenuifolium*	378000	1	0.3	$10.37
Common Mt. Mint	*Pycnanthemum virginianum*	220000	1	0.6	$17.82
Wild Rose	*Rosa spp.*	2500	0.1	5.2	$78.41
Sweet Coneflower	*Rudbeckia subtomentosa*	43000	1	3.0	$18.23
Smooth Goldenrod	*Solidago gigantea*	250000	1	0.5	na
New England Aster	*Symphyotrichum novae-angliae*	66000	1	2.0	$43.56
Sky-blue Aster	*Symphyotrichum oolentangiense*	80000	1	1.6	$13.07
Flat-topped Aster	*Symphyotrichum umbellata*	67000	1	2.0	$39.01
Purple Meadow Rue	*Thalictrum dasycarpum*	11000	0.1	1.2	$12.47
Prairie Spiderwort	*Tradescantia bracteata*	10000	0.1	1.3	$26.14
Ohio Spiderwort	*Tradescantia ohiensis*	8000	0.1	1.6	$32.67
Hoary Vervain	*Verbina stricta*	28000	1	4.7	$23.34
Ironweed	*Vernonia fasciculata*	24000	1	5.4	$81.68
Culver's Root	*Veronicastrum virginicum*	800000	1	0.2	$6.53
Golden Alexanders	*Zizia aurea*	11000	0.8	9.5	$57.02
		TOTAL(forb-nonlegume)	23.9		$1,395.03
		TOTAL(forb-legume)	3.8		$227.69
		TOTAL (grass)	12.6		$658.99
		Total Seeds/ft^2	40.2		**$2,281.71**

Appendix F. Prescribed Burn and Task Monitoring

Appendix G. Materials and Information for Volunteers

Information Relevant to the CVNT:

Invasive Species:
http://www.iowadnr.gov/forestry/invasive.html

Iowa Bird Breeding Atlas:
http://www.bba.iowabirds.org/

Audubon Society Website:
http://www.audubon.org/

Iowa Plant Species (Native, Ornamental and Exotic)
http://www.plantsofiowa.com/

BHCCB Volunteer Release Form

NOTICE

TO: ALL VOLUNTEERS ASSISTING BLACK HAWK COUNTY

We wish to thank you for your generosity in providing volunteer services to Black Hawk County. Your generosity and kindness are not only appreciated but are, in fact, needed by Black Hawk County to carry out its governmental duties.

We believe that it is important for you to know that as a volunteer, you are not a County employee and therefore, are not covered by the County's workers compensation insurance. Additionally, volunteers are not eligible for medical, dental, or related insurance coverage. If you have questions regarding how this affects you and your work as a volunteer to Black Hawk County, we recommend that you discuss those questions with your insurance carrier.

If you cause injury or property damage to another while assisting Black Hawk County, the County will step in and defend any claim against you or against the County as a result of the action. The County will not reimburse you for injury or damages to yourself occurring while you are assisting the County, unless you can establish that such injury or damage was a result of the County's negligence.

Please sign this Notice Receipt prior to beginning your volunteer service with Black Hawk County. Your signature indicates that you have received this notice of non-coverage. If you have questions, you may want to discuss this Notice with your legal advisor or your insurance advisor prior to signing.

Again, we thank you for giving of your time and talents to benefit Black Hawk County and its programs.

BLACK HAWK COUNTY BOARD OF SUPERVISORS

_____Departmental Representative

_____Department /Black Hawk County

_____

Work/Volunteer Activity Performed

RECEIPT Receipt of this Notice is hereby acknowledged by the undersigned volunteer on this

_____ Day of _____, 20___.

_____ _____

Volunteer(sign) Print Name

_____

Address

_____ _____ _____

City State Zip

_____or _____ _____

Telephone Cell Phone Email