

Natural Resource Inventory and Assessment

DRAFT

Prepared for:

City of Monticello

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I. INTRODUCTION AND PURPOSE

The purposes of a Natural Resource Inventory and Assessment (NRI/A) is to identify existing natural resources within an area, inventory these resources, and assess the resource's quality based on the types of plant species within the area. The NRI/A uses standard methodology developed by the Minnesota Department of Natural Resources to inventory and assess the quality of these areas.

The need for the development of this Natural Resource Inventory and Assessment (NRI/A) was outlined in the City of Monticello Comprehensive Plan as adopted in 2008. This plan identified natural resources as an important feature to consider for the future of Monticello. The Comprehensive plan states some of the City's goals are to:

- Create neighborhoods that allow residents to maintain a connection to the natural environmental and open space
- Reserve areas with high amenities for “move up” housing. These amenities may include forested areas, wetland complexes, adjacency to parks and greenways.
- Incorporate the natural characteristics of the setting in neighborhoods. Trees, terrain, drainageways, and other natural features provide character to neighborhoods.

The City of Monticello has recognized that environmental natural resources are important components of everyday life and require, now more than ever, conscientious management to ensure their existence into perpetuity. Not only do natural resources provide habitat for a multitude of wildlife, they also provide areas for people to recreate, live, and utilize for purposes such as agriculture, building material sources, and energy production.

As our society has changed over time, especially the past 20-30 years in that the interactions we have with the outdoors and nature have been reduced. There is an abundance of past and recent research that shows that the ability for people, especially children, to have opportunities to play and explore the outdoors brings significant cognitive, social, and health benefits. Therefore, being able to protect natural resources and provide communities the opportunity to explore these resources is important. (www.childrenandnature.org, 2008).

Recognition of the important natural resources within the community will allow the City to grow in a manner that takes these resources into consideration. This Natural Resource Inventory and Assessment (NRI/A) has been developed to:

- Identify high quality natural resources based on scientific review
- Identify natural resources that are important to the community
- Provide recommendations and strategies to assist the City in protecting the communities' important resources in the future

The project area is located in Wright County (**Figure 1**) and is comprised predominantly of the Orderly Annexation Area. Additionally, City staff chose several areas within the current city boundary to be included in the study because of their perceived recreational and/or ecological importance for the community. These areas include: Monte Club Hill, the Trumpeter Swan Viewing Area, a portion of the Pelican Lake Watershed, a city-owned property near the wastewater treatment facility along the

Mississippi River, and Camp Manitou (YMCA recreational property). In some cases the boundary of the project area was extended to align with roadways and highways. This was done for data quality purposes and to increase editing efficiency (*i.e.* having a straight and relatively permanent boundary decreases the potential inaccuracies inherent in combining regional data and decreases the amount of time needed for updating the data if the land cover changes in the future). The project area is 10,139 acres in size and surrounds the City of Monticello.

The Minnesota Land Cover Classification System (MLCCS) was used to inventory and classify the land cover features within the project area. To assess the relative quality of the natural vegetation communities, the Minnesota Department of Natural Resources (DNR) Natural Heritage Program Element Occurrence Ranking (EOR) guidelines were utilized. The natural community quality ranking reflects the general ecological condition of plant communities by taking into consideration the overall vegetative community health, the presence/absence of unnatural anthropogenic disturbances, and the presence/absence of invasive plant species. More information regarding the methodology of the NRI/A can be found below in the **Section III**.

Prior to the methodology of this study, **Section II** details existing data for the project area, which was used, in part, for identifying potential areas to field review. The results of the study are provided in **Section IV. Section V** which describes conclusions of the study and recommended strategies that are based on the results of this natural resource inventory and assessment. A full **References** section is provided at the end of the report for further information.

II. EXISTING INFORMATION

Multiple existing data sources were researched and compiled for the NRI/A analysis. The data sources included:

- Presettlement Vegetation
- Minnesota Department of Natural Resources Natural Heritage Information System (NHIS)
- Minnesota County Biological Survey (MCBS)
- National Wetlands Inventory
- Historic Aerial Imagery (1937, 1957, 1970)
- Natural Resources Conservation Service, Soil Survey for Wright County
- Minnesota State Historic Preservation Office
- Wright County Soil and Water Conservation District
- DNR Public Waters Inventory
- Minnesota Geologic Survey
- DNR Aggregate Mapping Program
- Relevant information was requested from the following agencies: National Park Service, Minnesota State Archaeologist, US Corps of Engineers, US Fish and Wildlife Service, Wright County Parks and Heritage Center.

A summary of selected information pertaining to the existing conditions of the project area follows:

Presettlement Vegetation

The original Public Land Survey notes of Minnesota, dating from 1848-1904, were compiled by Francis J. Marschner from 1929 to 1931 into a state-wide coverage map of the presettlement vegetation conditions of Minnesota. The survey indicated that the project area in northern Wright County was comprised primarily of oak openings and barrens, prairie, and hardwood forests of oak, maple, basswood and hickory (“Big Woods”) with inclusions of aspen-oak lands and lakes (**Figure 2**). This information is useful in understanding the overall landscape and to illustrate changes in the landscape that have occurred over the past 150 years. It also provides a baseline for establishing ecologic restoration plans and objectives.

DNR Natural Heritage Information System and Minnesota County Biological Survey

The NHIS database contains information pertaining to the location and identification of rare features. These features include endangered, threatened, and special concern plants and animals, native plant communities, animal aggregation sites, geological features and processes. The database was reviewed as part of the inventory process to identify the rarest features within the project area. The rare features found within or in proximity to the project area include:

- Trumpeter Swan (*Cygnus buccinator*); State threatened
- Bald Eagle (*Haliaeetus leucocephalus*); State special concern
- Blanding's Turtle (*Emydoidea blandingii*); State threatened
- Black Sandshell (*Ligumia recta*); State special concern
- Peregrine Falcon (*Falco peregrinus*); State threatened
- Dry Sand-Gravel Oak Savanna; Dry Sand-Gravel Prairie.

The Minnesota County Biological Survey began in 1987 and continues to survey the state for rare and significant biological features such as rare plant and animal species and native plant communities. Native plant communities are defined by the Mn/DNR as: “a group of native plants that interact with each other and the surrounding environment in ways not greatly altered by humans or by introduced plant or animal species. These groups of native plants form recognizable units, such as an oak forest, a prairie, or a marsh, that tend to repeat across the landscape and over time” (DNR website, 2008). The native plant communities identified by the DNR that occur within the project area include: Dry Sand-Gravel Prairie, Cattail-Sedge Marsh (Prairie), Oak-Shagbark Hickory Woodland, Silver Maple (Virginia Creeper) Floodplain Forest. Native plant community maps can be obtained from the DNR website at <http://www.dnr.state.mn.us/eco/mcbs/maps.html>. The native plant communities identified by the DNR are located in the northwest region of the project area near the Monticello nuclear power plant. With the exception of the installation of the power plant and road construction, this area has been undeveloped since circa 1930 and still retains remnants of native plant communities.

National Wetlands Inventory

The National Wetlands Inventory (NWI) is a national program of the US Fish and Wildlife Service. The NWI was based on aerial photo interpretation at an approximate 1:50,000 scale in combination with minimal field verification. Wetland boundaries on the NWI were completed remotely on a 1:24,000 scale orthogonal base. Although the NWI data are not as accurate as the field based results of this inventory, they do provide useful information regarding the location and type of wetlands that may be present in the city as well as providing a starting point for determining wetland locations within the project area.

Wright County Soil Survey

A digital version of the Soil Survey of Wright County was obtained from the Natural Resources Conservation Service (NRCS). The soils found within the project area are predominantly well drained to excessively drained fine textured loams and sands and poorly drained clay loams. The dominant soil types are Dorset sandy loam, Angus loam, Lester loam, Hubbard sand, and Cordova clay loam.

For mapping land cover features, the soil data was used to determine location and extent of mapped hydric soils to aid in determining wetland locations and preliminary land cover feature boundaries, which were further revised following field surveys. The soil survey also provided information pertaining to agriculture use and farmland quality and type. This information can be found in **Section IV** under *Soil Type and Farmland Suitability*.

III. METHODS FOR THE NATURAL RESOURCE INVENTORY AND ASSESSMENT

The process used in this NRI/A involved completing the Minnesota Land Cover Classification System (MLCCS) for the study area in conformance with DNR protocols as well as obtaining public input into the process. The methods and process used to develop this plan are detailed below.

A. Data Compilation and Land Cover Feature Delineation

The aforementioned data were compiled and entered into a geographic information system (GIS) to assist in remote (off-site) land cover classification and interpretation. Land cover features (polygons) were digitized (drawn) from 2005 aerial orthophotographs provided by Wright County at a scale of 1:2000. Upon completion of digitizing all distinct land cover features within the project area, each feature was remotely classified based on the type of land cover the feature represented using the methods described below.

B. Land Cover Classification

The land cover of the project area was classified using the Minnesota Land Cover Classification System (MLCCS), version 5.4, 2004. The manual and additional information is included on CD in **Appendix D**. The MLCCS was developed by the DNR to provide a systematic method to accurately map all land cover types including natural and semi-natural features such as forests, woodlands, shrublands, grasslands and wetlands, areas with sparse vegetation, and water. Additionally, the MLCCS classifies land cover types for non-natural (or cultural) features including features that are anthropogenic in nature. These cover types include artificial surfaces with greater than 4% imperviousness and maintained or planted vegetation.

The classification system is based on a five-tier hierarchical structure that uses land cover codes and descriptions to define the land cover types. Each level of the classification structure represents a level of descriptive detail relative to the adjacent level. So, level 1 represents the least descriptive position in the five tier structure and level 5 represents the most detailed level and describes the specific plant species composition of the feature. For example, a particular natural feature would be classified at level 1 as herbaceous vegetation. At level 5, this same feature would be classified as a dry prairie, sand-gravel subtype.

The scope of this NRI/A required that all features identified in the study area be identified to a level 3, indicating the type of natural or cultural feature that is being coded (i.e., upland deciduous forest or cultivated row crop). Areas that required further study as determined by the Prioritization Process described below were identified to a level 5 in the field. More information regarding the Prioritization Process can be found later in the Methods section.

C. MLCCS Modifiers

Several coded modifiers were used in the classification process. The purpose of these modifiers was to further define a land cover feature. These modifiers were assigned in the field and are based on the definitions provided in the MLCCS manual (**Appendix D**). A list of the modifiers used in this inventory and a brief description of each is below (note: the parenthetical component of the modifier name heading represents the field name in the attribute table of the GIS database).

Field Check Level Modifier (fld_level)

A field check level modifier is included in the GIS database and represents the extent to which each land cover feature was evaluated in the field. Below are the Field Check Level values and their associated description:

Field Check Level	Description
0	Site not visited
1	Viewed the site from a distance
2	Visited the edge of the site
3	Visited part of the site
4	Visited the entire site

Land Use Modifiers: Open Space Use (M_24x)

The open space land use modifier was used to identify those land cover features within the project area that were used or associated with Parks (241), Golf Courses (242), Cemeteries (245), Trail Corridors (247), and Natural Areas/Preserves (248).

Vegetation Management (M_30x)

The vegetation management modifier reflects the current vegetation management of a land cover feature and has two values in the MLCCS: 301 (Planted Community); 302 (Managed for Wildlife).

Natural Quality Modifier (M_34x)

The natural quality modifier was assigned to a given land cover feature as part of the assessment component of the NRI/A. The natural quality modifier represent the overall ecologic condition of a natural feature based on the DNR’s Natural Heritage’s Element Occurrence Ranking Guidelines (EOR) which can be found on CD in **Appendix D**.

The quality of a natural community is ranked on a continuum from “A” through “D.” The *A* quality ranking represents an excellent quality natural community whereas the *D* quality ranking represents a poor quality vegetative community. The quality ranking generally describes the ecological quality of a plant community considering the dominance of native vegetation, the presence or absence of anthropogenic sources of disturbance (agriculture, development, logging, grazing) and the presence or absence of invasive plant species within the land cover feature. The United States Department of Agriculture National Invasive Species Information Center defines an invasive species as a species that is: “1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health” (USDA website, 2008). In some cases the assessment guidelines and respective quality ranks were modified by the project natural resource specialist to account for varying degrees of ecological quality. In these cases, a composite ranking was used (e.g. AB, BC).

The M_34x modifier also includes values for describing semi-natural land cover types. These semi-natural land cover types generally describe areas that are dominated by invasive plant species or have been altered by some type of anthropogenic impact but are not so disturbed or altered that they would be classified as a cultural land cover type. In these instances, the modifiers NN (non-native) or NA (native) were used. The NN modifier was assigned to semi-natural communities that were significantly disturbed and retained very little or no native vegetation. In cases where a disturbed, semi-natural community contained moderate quantities of native vegetation (as determined by the project specialist), the NA modifier was used to signify the presence of native vegetation.

The descriptions of each value for the Natural Quality Modifier from the MLCCS manual are below:

A = Highest quality natural community, no disturbances and natural processes intact. Site must be visited entirely or partially to accurately assess its natural quality at this level (fld_level = 3 or 4).

B = Good quality natural community. Has its natural processes intact, but shows signs of past human impacts. Low levels of exotics. Site must be visited entirely or partially to accurately assess its natural quality at this level (fld_level = 3 or 4).

C = Moderate condition natural community with obvious past disturbance but is still clearly recognizable as a native community. Not dominated by weedy species in any layer. Minimally, the site must be visited from the edge to accurately assess its natural quality at this level (fld_level = 2, 3 or 4).

D = Poor condition of a natural community. Includes some natives, but is dominated by non-natives and/or is widely disturbed and altered. Herbaceous communities may be assessed with this ranking from a distance (fld_level = 1) if large masses of invasive species are present and the entire community is visible.

NA = Native species present in an altered/non-native plant community. This NA ranking can only be used if the site is field checked from the edge or to a greater degree (fld_level 2, 3, or 4), thus confirming the presence of native species within a non-native community.

NN = Altered/non-native plant community. These semi-natural communities do not qualify for natural quality ranking. Using NN signifies the site has been field checked and confirms it is a semi-natural community.

Invasive Species Modifier (M_4xx)

The Invasive Species Modifier represents the amount of invasive species occurring within a natural or semi-natural land cover feature. A list of Minnesota's most common invasive plant species can be found in the MLCCS manual (**Appendix D**). The most common upland invasive species encountered during this NRI/A were common buckthorn (*Rhamnus cathartica*), Tatarian honeysuckle (*Lonicera tatarica*), and smooth brome (*Bromus inermis*). The most common wetland invasive species were reed canary grass (*Phalaris arundinacea*) and narrow leaf or hybrid cattail (*Typha angustifolia*, *Typha X glauca*). The percent aerial cover (as viewed from above) of each species observed within a land cover feature was estimated at the time of field review and a value was assigned following the cover classes given below:

Cover Class	Description
0	Unknown, or if field checked, plants not observed
1	Observed, unknown quantity
2	1 – 5% coverage
3	6 – 25% coverage
4	26 – 50% coverage
5	51 – 75% coverage
6	76 – 100% coverage

Water Modifiers (M_7xx)

The Water Modifiers were used to further describe wetland or open water features (e.g. ditched or drained, water feature used for storm water management). They were also used to indicate the presence of wetlands in upland land cover features where the wetland feature was too small to be digitized as a separate land cover feature, but its presence was important to note.

D. Prioritization Process

Upon completion of the MLCCS remote level 3 classification, the natural resource features were prioritized for field assessments and subsequent MLCCS level 5 classification. This prioritization was based on two components:

1. Through data analysis and remote sensing procedures, many areas were deemed a priority area based on their potential to be significant natural features. These features were areas of high ecological quality or unique in the region that would require further field assessment. These areas were classified as “Areas of Ecological Significance.”
2. Areas were also rated a priority based on their perceived value for the community of Monticello. The high “community value” was given to areas that were highlighted by City Staff as areas that they defined as important to the community as a whole. Additionally, to ensure the public had a role in defining what they perceived as an important area, a public meeting was held to gather input from the citizens residing near or within the project area. These areas were classified as “Areas of Community Importance.”

To obtain public input, the City mailed post-cards to residents and landowners within the study area and along the border of the study area. The residents primarily included landowners within Monticello Township. The purpose of the public participation was to allow community members to discuss with the City where the important natural resources were in the community and to talk about why these resources were important. To determine these community resources, a two-step process was used. First, residents were asked to identify on a map areas or natural resources that were the most important to them. These areas were then discussed as a group and individually listed on a separate piece of paper. The second step was to have residents chose their most important areas from the group’s compiled list. To choose, residents were provided up to five sticky dots. Residents could either place the dots next to five of the locations they felt were the most important or place all five dots on one area. In this way, priorities of the community were identified. The areas that received the highest number of votes were deemed Areas of Community Importance. A summary of the results of public meeting is below in **Table 1**.

The community members who attended the meeting also expressed the overwhelming importance of protecting personal land, maintaining the community’s way of life, and protecting the personal

privacy that a rural community such as Monticello offers. While these values are not evaluated by a natural resource inventory, they are, nevertheless, of the utmost importance to a community and must be taken into consideration when interpreting the results and implications of an NRI/A.

Table 1. Summary of NRI/A Public Meeting

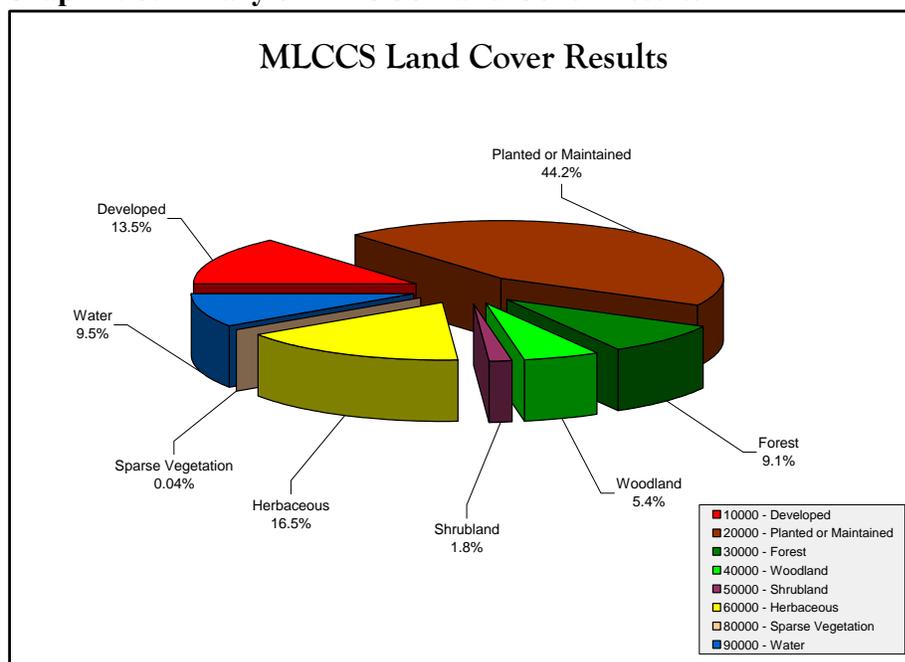
Recommended Area of Importance	Number of Votes
Horse Trail	0
Connections/Protection between city and townships	0
General Restoration	0
Prairie Acres	1
Old grave sites	1
Mississippi River	2
Otter Creek	2
Monte Club Hill	3
Woods and Wetlands	3
Elison Park	3
Pelican Lake and Watershed	4
Xcel Woodlands	5
Woods and Wildlife	5
Ag Land	5
Montissippi Park	6
Public Beach (YMCA)	7
Montissippi Creek	7
YMCA	13
Woods and Wetlands near Edmonson Avenue	16
Ditch 33 Watershed and Wetlands	16
Personal Property and Privacy	28
Total	127

IV. RESULTS OF THE NATURAL RESOURCE INVENTORY AND ASSESSMENT

A. Land Cover Classification

Land cover was classified to level 3, 4, and 5 for the entire 10,139 acres of the NRI/A project area. A total of 1,271 land cover features were used to describe the landscape of the project area. The size of the land cover features ranged from small wetlands and water bodies at sizes of 0.03 acres to large tracts of agricultural land at 354 acres. **Figure 3** shows the land cover at the broadest scale, level one. A summary graph and description of the land cover classification results is below. The graph can also be found in **Appendix B**.

Graph 1. Summary of MLCCS Land Cover Results



The cultural (non-natural) land cover type accounted for just over half of the total project area with a combined coverage of 57.7% (5856 acres). Of the cultural type the planted or maintained land cover class accounted for the greatest percentage (44.2%) of cover in the project area totaling 4,486 acres. This cover type is comprised predominantly of agricultural lands including hayfields, soybeans, corn, and wheat. It also includes areas of mowed vegetation such as those found along roads or highways. The developed cover type was 1,370 acres in size and accounted for 13.5 % of the area.

The natural and semi-natural land cover types totaled approximately 4,283 acres (42.3%). Of this, the herbaceous cover type represented the largest portion of the land cover totaling 1,669 acres (16.5%). Within the project area, the herbaceous vegetation included many natural and semi-natural communities such as dry prairie (sand-gravel subtype), wet meadows, cattail marshes, a mixed emergent marsh, and non-native dominated grasslands and wetlands.

Forests and woodlands accounted for 14.5% of the land cover totaling 1,471 acres. The natural forest communities included oak forests (including mesic and dry subtypes), maple-basswood forests, floodplain forests (including silver maple subtypes), lowland hardwood forests, and mixed hardwood swamps. The natural woodland communities were predominantly oak woodland-brushlands. One eastern red cedar woodland was documented near the Monticello nuclear power plant.

Shrublands, sparse vegetation cover types, and water features accounted for the remaining land cover. The shrublands (1.8%, 178 acres) were predominantly willow swamps. The sparse vegetation cover type included riverine sand flats and comprised only 4.6 acres or 0.04% of the total area. Water features, including small ponds, lakes and the Mississippi River, accounted for a total of 9.5% of the land cover (959.7 acres).

B. Archeological and Historical Areas

Information from the Minnesota State Historical Preservation Office (SHPO) was obtained as part of this study. SHPO provide a listing of archaeological and historic properties with the City of Monticello, the study area, and surrounding area.

There are a number of historic houses and properties within the heart of the City of Monticello near the Mississippi River. These areas include houses of prominent figures in Minnesota history and the Rigg's Ferry Landing site. These sites are outside of the study area, but are mentioned here for informational purposes.

Within the study area, the Nickerson Farm located on TH25 south of 85th Street NE is listed as an historic site. It is not listed on the National Register of Historic Places. Review of the historic records indicated that this site had been significantly altered throughout its existence and has since lost its historical significance.

There is also an archaeological site called Battle Rapids located along the Mississippi River on the east side of town in Section 24, T121, R24 within the study area that has been designated as an historic site by Wright County. The archaeological artifacts discovered at this site consisted of chert flakes and were designated as having minimal archaeological significance due to the historic human disturbance of the area.

C. Aggregate Resources

A GIS database containing aggregate resource information was obtained from the Mn/DNR, Division of Lands and Minerals. **Figure 4** shows geologic units that are inferred to contain potentially significant aggregate deposits as described by the DNR. **Figure 4** also shows locations of known gravel pits, both inactive and active.

D. Soil Type and Farmland Suitability

A GIS soil database was obtained from the Natural Resources Conservation Service (NRCS), Soil Data Mart. This database was queried to determine the farmland suitability of the soils within the project area, as determined by the NRCS. **Figure 5** shows the general locations of the Farmland Suitability Classes. The table below summarizes Farmland Suitability based on soil types and gives the acreages for each suitability class. This information does not take into account current land use practices.

Farmland Suitability (based on soil type)	Area (acres)
All areas are Prime Farmland	1558
Farmland of Statewide Importance	2958
Not Prime Farmland	4901
Prime Farmland if drained	688
Prime Farmland if protected from flooding	5

E. Natural Resource Inventory and Assessment

The natural resource inventory and assessment of the project area identified over 125 occurrences of natural features with varying degrees of ecological quality. It is important to note that because of the prioritization process, not all natural areas were thoroughly surveyed, classified, and assessed. The results of the NRI/A are in **Appendix B**.

Each natural community type is listed below with corresponding natural resource information as well as a short summary table (note: the C_NUM heading in the tables is equivalent to the MLCCS code). The unclassified areas (those that were not field-surveyed and were coded to a MLCCS level 3) are not included in the descriptions below but are listed in the summary table as general communities with unknown types (e.g. upland deciduous forest, woodland, or shrubland, and emergent vegetation). The DNR Natural Heritage descriptions of each natural community type documented in the project area can be found in **Appendix C**.

Seven land cover features were ranked as good quality or better (BC or greater). When identified in the following text, selected features are described by their unique identifier number (e.g. MONT 999), which is shown in the MLCCS GIS database as UNIQUE_ID. The high quality land cover features are summarized in the following tables (shown in pink), discussed in the text, and shown in **Figure 6**.

E.1 Forests (30000)

C_NUM	Description	Number of Occurrences	Total Area (Acres)	Quality Rank	Number of Ranked Occurrences
32100	Upland Deciduous Forest (Unknown Type)	18	103.84		
32110	Oak Forest	9	41.02	D	9
32112	Oak Forest Mesic Subtype	10	209.39	B (MONT 1743) C D	1 1 8
32113	Oak Forest Dry Subtype	2	13.35	C	2
32150	Maple Basswood Forest	9	59.41	C D	7 2
32210	Floodplain Forest	3	15.84	C ?	1 2
32211	Floodplain Forest Silver Maple Subtype	4	66.46	?	4
32220	Lowland Hardwood Forest	8	124.36	D	8
32320	Mixed Hardwood Swamp	2	25.03	C	2
Total Number of Occurrences		65	658.70		

Oak Forest and subtypes (MLCCS Codes 32110, 32112, 32113)

Twenty one oak forests accounted for a total of nearly 264 acres of the project area. Of this, 12 were subtyped as mesic (10) or dry (2). The oak forests were predominantly poor quality (D) with understories dominated by invasive shrubs such as common buckthorn (*Rhamnus cathartica*) and tatarian honeysuckle (*Lonicera tatarica*). However, there were 10 forests that were less impacted by invasive species and other

disturbance and were ranked as moderate quality (C). One oak forest was ranked as being a “good quality natural community” (B) having minimal quantities of invasive shrubs and little disturbance. This oak forest (MONT 1743) was located near the nuclear power facility. It was dominated by native canopy trees such as bur and red oak (*Quercus macrocarpa* and *Quercus rubra*, respectively), native understory trees and contained very little invasive shrub or herbaceous species.

Maple-basswood Forest (MLCCS Code 32150)

The project area contained nine instances of maple-basswood forest totaling just over 59 acres. All of the forests were of moderate or poor quality and were usually located near or within developed areas. One notable maple-basswood forest was located along the northern shore of Pelican Lake where it was isolated and not as impacted by development. It was, however, only of moderate quality due to past grazing impacts and nearby agricultural land uses.

Floodplain Forest and subtypes (MLCCS Codes 32210, 32211)

There were nine floodplain forest identified in the NRI/A. The silver maple subtypes were attained from the DNR’s MCBS classification of the land cover features. Because of the forests’ limited accessibility as islands in the Mississippi River, only one was field checked and assigned a quality rank of C (moderate quality).

Lowland Hardwood Forest (MLCCS Code 32220)

Eight lowland hardwood forests were present in the project area accounting for 124 acres of land cover. All of the lowland hardwood forests were poor quality (D) and contained significant amounts of invasive species such as common buckthorn.

Mixed Hardwood Swamp (MLCCS Code 32320)

Two mixed hardwood swamps were documented in the project area with a combined area of 25 acres. Both swamps were ranked as being moderate quality and had lower levels of invasive species and minimal evidence of significant disturbance. They were both located within the YMCA property and were associated with the wetland edges of the lakes. Because of access limitations, there is the possibility that there are additional hardwood swamps occurring on the YMCA property that were not assessed during this inventory.

E.2 Woodlands (40000)

C_NUM	Description	Number of Occurrences	Total Area (Acres)	Quality Rank	Number of Ranked Occurrences
41130	Eastern Red Cedar Woodland	1	2.47	D	1
42100	Upland Deciduous Woodland (Unknown Type)	57	141.99		
42120	Oak Woodland Brushland	30	203.69	C D	1 29
42300	Saturated Deciduous Woodland (Unknown Type)	12	12.18		
Total Number of Occurrences		100	360.33		

Eastern Red Cedar Woodland (MLCCS Code 41130)

One eastern red cedar woodland was documented in the project area and was nearly 2.5 acres in size. It was located on the nuclear power plant property and was associated with a large expanse of grassland with scattered red cedar. This feature, however, was classified as a separate woodland community based on the dominance of coniferous tree species and a tree cover of greater than 25%. The woodland had an herbaceous layer dominated by non-native species including smooth brome (*Bromus inermis*).

Oak Woodland-Brushland (MLCCS Code 42120)

The project area contained 30 oak woodland-brushland plant communities totaling nearly 204 acres of land cover. With one exception, all of the oak woodland-brushlands were ranked D (poor) quality. Historically, the oak woodland-brushlands were most likely oak savannas that have been overgrown with invasive shrub species. Common buckthorn infestation is a major problem associated with the oak woodland-brushlands of the project area. Nearly all of the oak communities had heavy infestations of buckthorn and Tatarian honeysuckle and would require significant resources to remove the invasive shrubs.

E.3 Shrublands (50000)

C_NUM	Description	Number of Occurrences	Total Area (Acres)	Quality Rank	Number of Ranked Occurrences
52100	Upland Deciduous Shrubland	4	9.97		
52300	Saturated Deciduous Shrubland	9	79.89		
52360	Willow Swamp - Saturated Soils	8	40.18	BC (MONT 599) C D	1 6 1
52430	Willow Swamp - Seasonally Flooded	7	15.78	AB (MONT 1752) C CD D	1 3 2 1
Total Number of Occurrences		28	145.82		

Willow Swamp (MLCCS Codes 52360, 52430)

Fifteen willow swamps were documented within the project area accounting for 56 acres of land cover. The majority of willow swamps were ranked as moderate to poor quality based on the presence of invasive wetland plant species such as narrow-leaf cattail (*Typha angustifolia*) and reed canary grass (*Phalaris arundinacea*).

Although much of the willow swamp land cover was low quality, there were two willow swamps that were rated as being very high quality (composite rankings of AB and BC:

MONT 1752 and MONT 599, respectively). These willow swamps were comprised of native shrubs and diverse herbaceous vegetation with little to no invasive plant species and minimal evidence of current or past disturbance. Both high quality willow swamps were located on the YMCA property.

The BC ranked willow swamp (MONT 599) surrounded an excellent quality wet meadow (described later). This willow swamp was dominated by native shrubs and herbaceous vegetation, but did contain a moderate amount of reed canary grass. Additionally, a portion of the willow swamp was adjacent to a powerline corridor and consequently has been impacted by this disturbance. As a result, this willow swamp was given the lower quality rank of BC.

The AB ranked willow swamp (MONT 1752) was located east of 90th Street NE and was a part of a very large wetland complex that extended out of the project area. This willow swamp contained a very diverse community of native shrubs and herbaceous vegetation and had no apparent invasive species, with the exception of isolated groups of reed canary grass at the very edge of the plant community. Because this willow swamp is part of such a large complex, it is highly probable that there are several other very high quality wetland communities contained within the complex. Unfortunately, the scope of this project did not allow for an extensive survey of this area, but it is highly recommended that this area be surveyed in more detail in the future.

Because these willow swamps are of such high quality, they are extremely sensitive to disturbance, and therefore, it is important to protect their integrity. Moreover, there is great educational value for the community of Monticello pertaining to the ecological resources inherent in these high quality natural areas and this educational value should be considered.

E.4 Herbaceous (60000)

C_NUM	Description	Number of Occurrences	Total Area (Acres)	Quality Rank	Number of Ranked Occurrences
61200	Medium-tall Grassland (Unknown Type)	46	135.25		
61213	Dry Prairie Sand-Gravel Subtype	3	8.35	C	3
61300	Temporarily Flooded Graminoid Vegetation	1	0.98		
61400	Saturated Graminoid Vegetation	35	89.38		
61420	Wet Meadow - Saturated Soils	7	19.03	A (MONT 1662) C D	1 2 4
61430	Cattail Marsh - Saturated Soils	1	0.43	C	1
61500	Seasonally Flooded Emergent Vegetation	31	139.90		
61510	Cattail Marsh - Seasonally Flooded	1	0.61	D	1
61520	Mixed Emergent Marsh - Seasonally Flooded	6	10.10	C D	1 5
61540	Wet Meadow - Seasonally Flooded	3	15.50	AB (MONT 518) BC (MONT 31) C	1 1 1
61600	Semipermanently Flooded Emergent Vegetation	14	37.25		
61610	Cattail Marsh - Semipermanently Flooded	2	2.40	BC (MONT 155) C	1 1
61620	Mixed Emergent Marsh - Semipermanently Flooded	1	6.88	D	1
61640	Wet Meadow - Semipermanently Flooded	1	6.89	D	1
61700	Intermittently Exposed Emergent Vegetation	2	2.84		
62100	Grassland With Sparse Deciduous Trees	31	65.43		
62123	Dry Oak Savanna Sand-Gravel Subtype	1	26.83	D	1
63210	Seepage Meadow	1	0.51	C	1
		Total Number of Occurrences	Total Area (Acres)		
		187	568.56		

Dry Prairie, Sand-Gravel Subtype (MLCCS Code 61213)

Three remnant dry prairies were documented within the project boundary comprising 8.35 acres. These had previously been identified by the DNR and are included in the MCBS survey. These prairies were of moderate quality, being impacted by invasive vegetation and other disturbances. However, the remnants were dominated by big bluestem (*Andropogon gerardii*) and still contained many other native plant species including lead plant (*Amorpha canescens*), hoary vervain (*Verbena stricta*), and rigid goldenrod (*Solidago rigida*). These remnants are located along the railroad corridor near the nuclear power plant. Because of their location and proximity to roads and development, these areas are continually under development pressures and disturbance from the nearby roads. Therefore these remnants should be considered for protection under conservation easements.

Dry Oak Savanna, Sand-Gravel Subtype (MLCCS Code 62123)

One land cover feature in the project area was classified as a dry oak savanna, sand-gravel subtype. It was 26.83 acres in size and was located on the northern side of county road 75 along the nuclear power facility property. The Mn/DNR classified this area as a dry prairie, sand gravel subtype in the MCBS. Because the tree cover in the feature was greater than 10%, the coding scheme of the MLCCS classified the area as having sparse tree cover and as such, it coded as a savanna. This area contains an abundance of smooth brome (*Bromus inermis*) in the herbaceous layer and invasive shrubs such as common buckthorn. County Road 75 is a source of disturbance to this prairie/savanna remnant and future management strategies are recommended to ensure its continued existence.

Wet Meadow (MLCCS Codes 61420, 61540, 61640)

Eleven wet meadows of varying hydrologic regimes were documented during the NRI/A accounting for just over 41 acres over land cover. Eight of the wet meadows were poor quality (D) and contained an abundance of invasive vegetation, mostly reed canary grass. The remaining three wet meadows were much higher quality, ranking as BC (moderately good quality), AB (good to excellent quality), and one was ranked A (excellent quality). All of these higher quality wet meadows exhibited high biodiversity with lesser amounts of invasive vegetation and minimal evidence of anthropogenic disturbance.

The BC quality wet meadow (MONT 31) was located on the northern side of Pelican Lake. This wet meadow had minimal invasive vegetation and was dominated by native wetland plants. There was some disturbance (crop activity) in proximity to this wetland as well as some reed canary grass present within the wetland. The quality ranking for this wet meadow reflects this.

Both the A (MONT 1662) and AB quality (MONT 518) wet meadows were located on the YMCA property. The A quality wet meadow was located just to the north of the swimming beach on Beltram Lake. From the historic aerial photo review, it appeared that this wetland had minimal impacts or disturbance from the 1930's to the present. There was no invasive vegetation observed at the time of the field visit and the wetland was comprised of diverse, native wetland vegetation characteristic of high quality wet meadows. The AB wet meadow was located near the AB quality willow swamp discussed previously in Section B.3. This wetland was dominated by native sedges, forbs, and grasses. There was minimal invasive species present. That which was present occurred in isolated areas near the boundary of the wet meadow and adjacent upland areas.

Cattail Marsh (MLCCS Codes 61430, 61510, 61610)

The project area contained four land cover features classified as cattail marshes and accounted for 3.4 acres. Three of the four were poor quality (D) and contained significant amounts of invasive species with evidence of recent disturbance. One cattail marsh (MONT 1550) was moderately good quality (BC) and was located within a non-native dominated wetland. This BC cattail marsh was dominated by native cattail (*Typha latifolia*) and had minimal invasive species present with high numbers of native wetland plant species.

It should be noted that in the MLCCS, wetland features that are dominated by non-native vegetation are coded as a semi-natural plant community. For example, cattail marshes that are comprised of a monotypic stand of narrow-leaf or hybrid cattail (*Typha angustifolia*, *Typha X glauca*) with little biodiversity are considered altered/non-native communities and are coded as such. A cattail marsh, as coded by the MLCCS, will be dominated by native vegetation, although may have invasive species present which will subsequently decrease the ecological quality of the plant community. This same theory applies to wet meadows that are a monotypic stands of reed canary grass. These are coded as altered/non-native land cover features.

Mixed Emergent Marsh (MLCCS Codes 61520, 61620)

Seven mixed emergent marshes were indentified in the NRI/A project area covering nearly 17 acres. These mixed emergent marshes were all moderate (C) or poor (D) quality and contained significant quantities of invasive vegetation as well as exhibited evidence of human disturbance.

Seepage Meadow (MLCCS Code 63210)

One seepage meadow was documented in the project area and was 0.51 acres in size. It was a moderate (C) quality seepage meadow containing diverse, native vegetation, but did have invasive species present with some signs of disturbance. The seepage meadow was located on a steep side-hill along the banks of the Mississippi River within the nuclear power plant property.

E.5 Summary of High Quality Features

As described above, seven land cover features were ranked as good quality or better (BC or greater). This ranking was based on the DNR Natural Heritage’s Element of Occurrence Ranking Guidelines described in **Section III**. These areas represent good quality areas that should be considered for protection if areas develop or projects are proposed. The high quality land cover features are summarized in the following table and shown in **Figure 6**.

Table 2. High quality land cover features

Identifier Number (UNIQUE ID)	MLCCS Code (C NUM)	Natural Community Description (C TEXT)	Quality Rank (M 34X)
MONT 31	61540	Wet Meadow	BC
MONT 518	61540	Wet Meadow	AB
MONT 599	52360	Willow Swamp	BC
MONT 1550	61610	Cattail Marsh	BC
MONT 1662	61420	Wet Meadow	A
MONT 1743	32112	Oak Forest	B
MONT 1752	52430	Willow Swamp	AB

F. Areas of Ecological Significance and Community Importance

Several areas, in addition to the significant natural areas discussed previously, were identified from the prioritization process outlined in the **Section III. Figure 7** shows the locations of the Areas of Ecological Significance and Community Importance within the project boundary. Below is a list of the Areas of Community Importance as well as a discussion of each one in relation to the NRI/A:

- YMCA Camp Manitou
- Monte Club Hill
- Pelican Lake Subwatershed
- Woods and Wetlands near Edmonson Road
- Ditch 33 Watershed and Wetlands
- Nuclear Power Plant and Montissippi Park
- Personal Property and Privacy

F.1 YMCA Camp Manitou

The YMCA Camp Manitou property is comprised of multiple land cover types including some developed areas with buildings and public facilities, agricultural lands, pine plantations, natural forests, woodlands and shrublands, wetlands and open water bodies. A majority of the property has been used for agriculture, grazing, pine plantations, and other cultural uses. The past land uses have had a negative impact on much of the natural resources within the property and have resulted in many of the woodlands and forests being altered. These wooded areas show evidence of past grazing practices and contain significant amounts of invasive plant species such as buckthorn and tatarian honeysuckle.

Historically, this area was predominantly oak savanna and prairie and there is evidence of the oak savanna in the form of old, mature oak trees with a growth form indicative of savanna-like conditions. There is a rather unique forested area on the property where the predominant tree species is ironwood (*Ostrya virginiana*). This forest was historically most likely a mesic oak forest. However, through the past utilization of the property there are few canopy trees currently present. The majority of the forest is comprised of an understory of ironwood trees, some of which appear to be quite mature. This area is positioned on top of a glacial esker and forms a unique feature in the landscape of the property.

The majority of the wetlands on the property are of moderate quality with invasive species such as reed canary grass and narrow-leaf cattail being present along with native plant species. This is normal for this property and the surrounding area. However, the YMCA property is unique within the project area in that it contains the majority of high quality natural features. As stated previously, there is an excellent (A) quality wet meadow that warrants recognition (MONT 1662). It is a high quality wet meadow dominated exclusively by native sedges, grasses and forbs. Within the interior of the wetland, no invasive non-native vegetation was observed. This is a unique feature on the property and within the surrounding area and should be protected to ensure its continued survival.

Additionally, there is a large wetland complex residing within the portion of the property east of 90th Street Northeast. The high quality wetland features MONT 518 and MONT 1752 are

located on the northern portion of this wetland complex, which is quite extensive and extends out of the project area. It is comprised of several land cover types and has the potential to contain many high quality natural features. Because of the historical presettlement vegetation of the region, this wetland complex could contain unique natural features such as wet and mesic prairies as well as upland features such as remnant prairies and savannas. It is recommended that further, in-depth field surveys be completed for this area.

There is a chain of medium sized lakes on the property totaling approximately 270 acres. One lake, Beltram Lake, is currently used for recreational purposes and has a relatively low quality wetland fringe along the shore consisting predominantly of narrow-leaf cattail. The other lakes are fringed by moderate quality shrub swamps which grade into lowland hardwood swamps. Again, invasive plant species are present in these communities, but not in large amounts.

The YMCA Camp Manitou provides a unique resource for the Monticello Community. Not only does it have the infrastructure to provide many recreational opportunities for the people of Monticello, but it also contains many high quality natural features that are rare in the project area as well as the surrounding area. These natural features have the potential to be an excellent resource for educating the community on the beauty, habitat, and ecological benefits that native plant communities provide. Placing these high quality native plant communities into conservation easements is highly recommended.

F.2 Monte Club Hill

Monte Club Hill offers an excellent opportunity to be utilized as a recreational and educational park for the Monticello Community. There are existing parking areas and access roads to the property, although one area is presently abandoned, unmaintained, and inaccessible to the public. The property is significantly elevated in the landscape, being over 100 feet above the surrounding area. This elevated position provides excellent vantage points to clearly see the picturesque city as well as the beautiful countryside of farms and patches of woods and wetlands.

The vegetative communities of Monte Club Hill are poor quality oak woodland-brushlands and altered/non-native dominated grasslands. The woodlands suffer from severe infestations of common buckthorn and the grasslands are dominated by non-native species including smooth brome. Historically, this area was most likely an oak savanna dominated by native prairie grasses and forbs that was grading to oak woodland.

The Monte Club Hill site has a very high potential for successful ecological restoration and development into a useful and educational park for the community. From a restoration perspective, the invasive shrub layer could be cleared out and opened up for native vegetation to take hold and become dominant. The surrounding areas could be seeded with native grasses and forbs to approximate presettlement conditions of an oak savanna. There are many mature bur and red oaks on site and would provide the tree component of the savanna, without having to wait many years for new seedlings to mature. This restoration would be intense and would require significant management. However, Monte Club Hill Park could provide the Monticello community with a central location to visit, relax, enjoy the magnificent views, and learn about the savannas and prairies that dominated the landscape 150 years ago.

F.3 Pelican Lake Watershed

Pelican Lake is a shallow lake that provides significant habitat for a variety of wildlife, especially waterfowl. The lake is isolated with no naturally occurring outlet. As such, fluctuating water elevations on the lake have been an issue for the area and for some residents south of the lake. The DNR is proposing to construct an outlet to the south that would direct water to St. Michael and the Crow River. This project is still in the planning stages and is mentioned here for informational purposes only.

The northern-most section of Pelican Lake is within the project boundary and there is a large US Fish and Wildlife Service Waterfowl Production Area (WPA) located in this region (**Figure 8**). A majority of the watershed within the project area is currently agricultural. The wetland fringe around the lake is predominantly altered communities dominated by narrow-leaf cattail and reed canary grass. However, there were two significant natural resources associated with this area. As mentioned previously, there was a higher quality wet meadow that contained an abundance of native herbaceous vegetation with minimal amounts of reed canary grass (feature MONT 31). There was also a section of maple-basswood forest along the northern border of the lake. With the creation of the US Fish and Wildlife WPA, both features are now protected from future development.

F.4 Woods and Wetlands Near Edmonson Avenue

The land cover features occurring along Edmonson Avenue near the southern boundary of the project area are predominantly disturbed natural and semi-natural areas. Historically, the area has been impacted by development and agricultural practices resulting in degraded woodlands and wetlands. This area, however, does function as a portion of a larger natural connection from the wetlands to the south through developed areas and agriculture fields to Pelican Lake. **Figure 8** shows the greenway connections for the project area and the Edmonson Avenue woods and wetlands are included in the greenway corridor. More information regarding greenway corridors can be found in **Section V**.

There is a forested area just to the east of Edmonson Avenue between a developed area and an agricultural field. Review of historic aerial photographs indicated that this forest has been present since the mid-1930's. A field review of the area resulted in its classification of a mesic oak forest of poor quality. The forest was dominated by invasive shrub species (common buckthorn and tatarian honeysuckle) and had evidence of past grazing practices. The dominant sub canopy tree present in the forest was ironwood and the vegetative community structure resembled that of the "ironwood forest" of the YMCA property. However, this mesic oak forest contained many more mature oaks and basswood trees in the canopy, some of which were very large and appeared to be very old. This oak forest is one of the few remaining forests in the project area that have not been logged or converted to farmland in the past 80 to 100 years. Although it is ecologically degraded, it is important as a historic natural community and provides a recreational area for local landowners.

F.5 Ditch 33 Watershed and Wetlands

The Ditch 33 watershed is located in the northeast portion of the project area and is bisected by Interstate 94. There are several large wetland complexes associated with this area. The wetlands are all severely degraded and are dominated by invasive, non-native plant species such as reed

canary grass and narrow-leaf cattail. Very few native plant assemblages are present within the area and those that are present are highly fragmented. The wooded areas contain severe infestations of invasive shrubs and possess evidence of past grazing impacts as well as dumping practices. These woods, however, do provide significant wildlife habitat and act as a natural buffer between the lowlands and the farmed or developed uplands. Overall, the Ditch 33 area has been impacted by agriculture and development and many of the wetlands are effectively drained by the ditch system. There are many opportunities for wetland restoration projects in this area.

F.6 Nuclear Power Plant, Montissippi Park, and Surrounding Environs

The northwestern portion of the project area contains several regions that are ecologically important and have community value. There are remnant native dry prairies in proximity to both the nuclear power plant and Montissippi Park. These dry prairies have been documented and mapped by the DNR MCBS and all three remnants were located along the railroad tracks leading to the nuclear power facility. In addition to these three prairie remnants, there were two areas (MONT 1785, MONT 1787) documented within the nuclear power plant property that, although not dominated by native prairie vegetation, contained several native plant species in significant numbers, including those listed above. Due to access limitations, these areas were not fully surveyed. However, because of the presence of native vegetation and the geographic locations of these areas, it is recommended that a more extensive survey be completed to document the possible presence of additional native prairie remnants. The nuclear power plant property also contains a remnant oak savanna, large tracts of mature oak woodlands, and forests that, although are infested with invasive vegetation, provide an abundance of habitat for wildlife and have the potential to be restored to higher quality natural features.

Montissippi Park is an important resource for the Monticello Community. It provides the public with picnic grounds, a boat launch to the Mississippi River, small day-use areas, and access points to many paved and un-paved trails. It also contains many natural features including oak woodlands, Montissippi Creek, and a large lowland hardwood forest containing small wetlands and backwaters of Montissippi Creek. Each area provides wildlife habitat and a natural buffer between the river and development.

These natural areas, in combination, serve as a large region of relatively undeveloped land that can function as an important component of future greenway corridors, open space, and restoration opportunities.

F.7 Personal Property and Privacy

As stated above, protecting personal land, maintaining the community's way of life, and protecting personal privacy is very important to the Monticello Community. These personal values cannot be quantified by a natural resource inventory, but nevertheless, they are a vital element of this study. Getting the community involved in the NRI/A process and hearing their viewpoints and opinions was a major component in selecting priority areas for further, in depth review and analysis. Natural resources truly belong to a community as a whole and input from the community was essential in understanding what areas within the project area would benefit the most from the assessment process. Additionally, the community's interests must be taken into consideration when interpreting the results of an NRI/A and its related goals and strategies.

V. CONCLUSIONS AND RECOMMENDATIONS

The study area contains large areas of agricultural uses interspersed by areas of varying quality natural resources. A few areas were identified as areas of ecological importance due to their high quality and other areas were identified as areas of community importance by the landowners in the area. The purpose of this study was to identify areas of ecological and community importance to assist decision-makers in determining priorities for the area.

The need for the development of this Natural Resource Inventory and Assessment (NRI/A) was outlined in the City's Comprehensive Plan adopted in 2008. This plan identified natural resources as an important feature to consider for the future of Monticello. The Comprehensive plan states some of the City's goals are to:

- Create neighborhoods that allow residents to maintain a connection to the natural environmental and open space
- Reserve areas with high amenities for "move up" housing. These amenities may include forested areas, wetland complexes, adjacency to parks and greenways.
- Incorporate the natural characteristics of the setting in the neighborhoods. Trees, terrain, drainageways, and other natural features provide character to neighborhoods.

Within that context, there are a number of recommendations the City could consider to meet the goals of the Comprehensive Plan. These recommendations can generally be divided into four categories including: A) develop management plans for selected sites, B) develop public education plan, C) develop or update regulations or ordinances, or D) plan for future public land.

A. Develop Natural Resource Management Plans

A number of areas were identified throughout this report as areas that would benefit from restoration, vegetation management, or protection. These areas are identified below with suggested management, protection, or restoration techniques. Restoration or management could occur through a City project or through the development review process if the property is developed. Protection could be accomplished through public acquisition of an area or through conservation easements. A more detailed management plan would need to be developed for each site prior to implementation. The specific sites that the City should consider include:

1. **Monte Club Hill:** The City currently owns Monte Club Hill and coupled with other factors make it a good candidate for restoration activity and well as park development. As stated above this site contains degraded oak woodlands-brushlands and grasslands. The presence of large mature oak trees and scattered grasslands sets the stage for restoring the landscape to prairie and savanna. Restoration would involve a buckthorn removal program and ongoing maintenance to control new buckthorn growth. The surrounding areas could be seeded with native grasses and forbs to approximate presettlement conditions of an oak savanna. There are many mature bur and red oaks on site and would provide the tree component of the savanna, without having to wait many years for new seedlings to mature. This restoration would be intense and would require significant management.

Additionally, the site can easily support infrastructure for parking, educational signage, scenic viewing areas, and trails. Monte Club Hill offers an exceptional opportunity to educate the community of Monticello about native habitats and about the landscape prior to European settlement of the area. There is also an opportunity to increase awareness of the importance of Minnesota's native plant communities and the role ecological restoration can have in enhancing the quality of natural landscapes. Monte Club Hill should be considered a high priority for restoration and development into a functional city park. Monte Club Hill Park could provide the Monticello community with a central location to visit, relax, enjoy the magnificent views, and learn about the savannas and prairies that dominated the landscape 150 years ago.

- 2. YMCA Camp Manitou:** The City is currently in the process of acquiring portions of the YMCA property. This property contains multiple high-quality natural areas that require conservation and could serve an educational purpose for the community. Additionally, the property has an established, basic infrastructure that would allow immediate use by the community. A natural resource management plan for this site would involve a decision-making process to decide the ultimate use for each portion of the park. These uses could include: creating a public park and lake access for boating and recreation on Bertram Lake; designating natural and wild areas that would preserve the high to moderate quality natural resources on the property; and uses that may allow development in the agricultural areas of the park. The management plan would vary depending on the designated use. Areas left more natural would benefit from prescribed fire management and/or invasive species removal. Areas designated for public use would need mowing and tree management to remove trees considered a hazard to the public (such as dead or dying trees). Because this area is very large, a comprehensive management plan for the site would be needed. Until the City or other entities are ready to develop that type of management plan, keeping the high quality areas and/or recreational areas in public or park management ownership is the recommended priority.
- 3. Oak Savanna and Prairie at Power Plant:** The woodlands and grasslands present within the nuclear power plant property are degraded and infested with non-native, invasive herbaceous and shrub vegetation. Due to access limitations, these areas were not fully surveyed and it is recommended that more extensive survey be completed to document the presence of native prairie remnants. The property offers a unique opportunity for restoration in that it has been relatively undisturbed since before the 1930's, there is minimal future development prospects on the property, and it adjoins a county-owned park, which increases the overall size of a natural corridor. There are native prairie remnants near the property with large tracts of oak woodland and forests throughout the area. With carefully planned restoration measures and incorporating conservation easements, a significant portion of the pre-settlement oak savanna and prairie could be restored for the benefit of both the community and environment. The City should consider approaching Xcel Energy with this information to determine if Xcel would be interested in restoring their grasslands.
- 4. Pelican Lake Subwatershed:** The Pelican Lake subwatershed is approximately 890 acres within the study area. The lake is a shallow lake and provides an ideal location for waterfowl. Fluctuating water elevations on the lake have been an issue for the area and for residents south of the lake outside of the study area. As stated in **Section IV**, the DNR is

proposing to construct an outlet to the south that would direct water to St. Michael and the Crow River. This project is still in the planning stages.

Increased impervious surface within the subwatershed could lead to additional storm water being directed to the Lake. If development occurs in this area, it is recommended that the City adopt additional storm water management requirements for storm water retention, infiltration, and or reduced impervious coverage specifically for this subwatershed.

The wet meadow and maple-basswood forest discussed above are already within the US Fish and Wildlife Service (USFWS) WPA. Since this area is under USFWS management, no additional management is recommended for the City.

5. Ditch 33 Watershed and Wetlands: Overall, the Ditch 33 area has been impacted by agriculture and development and many of the wetlands are effectively drained by the ditch system. There are many opportunities for wetland restoration projects in this area. Restoration of these wetlands would involve controlling invasive species such as reed canary grass. Providing additional storm water storage in this area is also important. It is recommended that if development occurs in this area, additional storm water storage and wetland restoration be incorporated into the project. Additional City resources into restoring these areas are not recommended at this time unless grant money or other funding sources become available.

6. Protect High Quality Natural Areas: Seven high quality natural land cover features were identified during this inventory and assessment and were discussed above. They are summarized again below for reference and are shown on **Figure 6:**

Identifier Number (UNIQUE ID)	MLCCS (C NUM)	Code	Natural Community Description (C TEXT)	Quality Rank (M 34X)
MONT 31	61540		Wet Meadow	BC
MONT 518	61540		Wet Meadow	AB
MONT 599	52360		Willow Swamp	BC
MONT 1550	61610		Cattail Marsh	BC
MONT 1662	61420		Wet Meadow	A
MONT 1743	32112		Oak Forest	B
MONT 1752	52430		Willow Swamp	AB

MONT 31 is located adjacent to Pelican Lake and is managed by the US Fish and Wildlife Service. No additional action is recommended.

MONT 518 and 1752 are located east of 90th Street Northeast within the YMCA property. If opportunities arise to purchase this area for public parkland, it is recommended the City consider this option so the area can be protected. Creating nature trails adjacent to these high quality areas can also assist in public education of the importance of these resources. Because of the historical presettlement vegetation of the region, this wetland complex could contain unique natural features such as wet and mesic prairies as well as upland features such as remnant prairies and savannas. It is recommended that additional evaluation of this extensive wetland complex be undertaken since a complete survey of this area was not possible within the scope of this study.

MONT 599 and 1662 are north of Bertram Lake within the YMCA property. This wetland complex is currently isolated as it is surrounded by wooded upland areas. To protect this area, it is recommended that the surrounding upland remain intact and no disturbance occur within its watershed or at least 500 feet.

MONT 1550 is part of a wetland complex on private property west of the old Silver Springs Golf Course. No immediate action is recommended. If this area develops in the future, it is recommended that protection for this wetland in the form of upland buffer around this wetland be employed.

MONT 1743 is located on the nuclear power plant property. Because of the current use of the property, the site is isolated from development.

Overall, these features represent relatively undisturbed native plant communities and efforts should be taken to ensure that they remain in a natural state if development occurs. These areas are very sensitive to disturbance so it is important to develop strategies (such as conservation easements) to reduce impacts in proximity to the features, minimize sources of disturbance, and protect their vegetative integrity through invasive species management.

7. **Prairie Remnants on Railroad Corridor:** These remnants are located along the railroad corridor near the nuclear power plant in the northwestern portion of the study area. Because of their location and proximity to roads and development, these areas are continually under development pressures and disturbance from the nearby roads. Therefore these remnants should be considered for protection under conservation easements and/or taken into consideration for protection if future road projects are proposed.

B. Develop Public Education Plan

As stated in the introduction to this NRI/A, as our society has changed over time in the past 20-30 years, the interactions we have with the outdoors and nature have been reduced. There is an abundance of past and recent research that shows that the ability for people, especially children, to have opportunities to play and explore the outdoors brings significant cognitive, social, and health benefits. Therefore, being able to protect natural resources and provide communities the opportunity to explore these resources is important. (www.childrenandnature.org, 2008).

The City should consider incorporating the information provided in this NRI/A into public education opportunities. This can include interpretive signage at existing and future parks, inclusion of nature trails to allow the community to access and learn about these resources, and discussions with the local schools about incorporating the information in this study into science programs. Many cities have a Nature Center with environmental education staff that provides programming and opportunities for residents in the region to play, learn, and protect natural resources. The Camp Manitou property lends itself to this type of opportunity.

Additionally, many communities around the Twin Cities are increasing public awareness of invasive vegetation in an effort to slow the spread of infestations and remove existing invasive species from natural habitats. For example, some communities have literature available that describes what the invasive plants look like and gives recommendations on how to kill and

remove the plants. There are also invasive species management events such as “Buckthorn Busting” days where community members get together to help in the eradication of common buckthorn. There are many opportunities to get the public involved in enhancing the quality of their natural resources.

C. Develop or Update Regulations

Either developing new ordinances or updating existing ordinances related to future development can assist the City in protecting and enhancing those features which are important to the community. A description of possible ordinance considerations is provided below.

- 1. Conservation Development Ordinance:** In general, conservation development is the practice of maintaining development density in an area while preserving open space and natural resources by clustering the development on land that does not contain significant natural resources. This type of development is supported in the City’s Comprehensive Plan.
- 2. Natural Resource Ordinance:** Many cities have adopted a natural resource ordinance. These ordinances relate to tree preservation and replacement, wetland protection, steep slopes, and significant natural resource protection. While wetlands are already protected through State and Federal law, upland areas that contain significant natural resources are not. This type of ordinance can be used in conjunction with a Conservation Development Ordinance.
- 3. Shoreland Ordinance:** Currently, the City does not have a shoreland ordinance. The City’s Comprehensive Storm Water Management Plan identifies the need for the City to adopt a shoreland ordinance with implementation of this task anticipated by 2010. A shoreland ordinance is used to protect areas around DNR Public Waters. The ordinance then outlines setbacks from Public Waters for structures, septic systems, roads as well as vegetation removal around these waters if development occurs. The City could only do this in areas where they have land planning and zoning authority.
- 4. Restoration Ordinance:** Much of the wetland and upland areas throughout the project area are degraded. To help enhance the quality of the remaining natural features, the city could adopt a Restoration Ordinance. This would require developers to set aside a percentage of developable land as open space. This land would then be restored to prairie (if grassland) or would have invasive vegetation removed (if wooded). For development areas with minimal upland area available for open space but with abundant degraded wetlands, the developer would be required to restore the wetlands in lieu of setting aside upland open space. All restored areas would be placed under conservation easements.
- 5. Native Vegetation Ordinance:** One of the unique features of the City and the study area are the remnant prairie areas along the road and railroad corridors. While native prairie cannot be re-created, working to revegetate areas with prairie species provides habitat, highlights this unique feature of the area, and also reduces right-of-way maintenance in the long term. A native vegetation ordinance could be developed to adopt standards to revegetate road right-of-way with native species as well as requiring exclusive use of native seed mixes along newly constructed roadsides and appropriate open spaces.

6. **Storm Water Management Ordinance:** This type of ordinance is used to enforce the policies within the City's Storm Water Management Plan. This would then provide enforcement and direction for new development and redevelopment for storm water quality treatment, rate control, and volume control. Additionally, impervious surface requirements could apply by zoning district when areas develop to assist in reducing impacts on natural resources (such as sensitive wetlands and lakes) and to more effectively plan regional storm water systems in a cost effective manner.
7. **Update Park Dedication Requirements:** If development occurs in the City, the current park dedication requirements are 10% of total development acreage or \$3,500 per unit. The city could revise these requirements to be on a sliding scale based on the development and also included greenway corridor implementation in commercial or industrial areas.
8. **Develop Framework for Transfer of Development Rights:** Transfer of development rights refers to a method for protecting land by transferring the "rights to develop" from one area and giving them to another. This tool is designed to facilitate land use planning and protect important resources. A more detailed plan for this type of system would need to be developed with the stakeholders in the area.

D. Plan for Future Public or Park Land

If properties with ecological significance or community importance identified in this plan are anticipated to be sold by the landowner, the City could consider purchasing the land for park and greenway space. Areas with high quality resources, areas that are important to the community as identified in this plan, or areas that provide connection between these resources should be considered first. These areas have been described in the previous sections, with recommendations provided.

Additionally, **Figure 8** shows conceptual greenway corridors connecting the major parks of the City and future annexation area as well as many of the natural features of the project area. These corridors were estimated based on the presence of natural land cover features, existing parks and open spaces, locations of Areas of Community Importance, and locations of conservation areas. Greenway corridors provide connections between and among natural open spaces and parks. These corridors can be for human use in the form of trails and walkways. They can also be natural areas such as wildlife corridors with no developed trail system or other disturbance within the corridor.

The wetland systems of the project area are excellent candidates for incorporation into greenway corridors, either as part of a trail system or preserved as natural open space. These systems are not suitable for development or agriculture and are already protected under the Wetland Conservation Act. Installing trails along the corridors would enable the community to enjoy the natural beauty the wetlands provide and also to learn about the importance of wetlands. Additionally, trail systems can provide a buffer between existing wetlands and future development. Educational signage along trails and paths is an important component of trail installation near or within natural landscapes.

The existing powerline corridors within the project area and inside the city limits can provide open space and greenway corridors for either community use (trails, parks, etc) or natural open space. Their function as natural open space is limited because of the maintenance requirements

of the powerline structures as well as the corridor itself. Usually there is some type of vegetation control regiment that limits the ability of the corridor to return to a natural state. However, native vegetation could be planted and maintained within the corridors to provide a more natural looking landscape and habitat for wildlife.

The City of Monticello has recognized the importance of natural resources in planning for a community's growth and prosperity. This Natural Resource Inventory and Assessment is a first step in understanding what those natural resources are, what ecological quality they possess, where they are located, and what can be done to protect, enhance, or utilize them.

The natural resources within the Monticello project area are mostly degraded and impacted by human land use practices and contain significant amounts of invasive plant species. However, there are several high quality native plant communities that occur within the project area as well as rare natural features that are recognized by the DNR. These features are scarce in the project area and surrounding region and should be considered important assets for the Monticello Community. The numbers of native plant communities are dwindling in the Twin Cities urban area and need to be preserved. They are vital components of large scale ecological processes, they provide habitat for wildlife, give natural beauty and educational opportunities to the community, act as natural buffers between developed areas and are important facets of the natural history of Minnesota. Protecting them should be a high priority for the community to ensure that these unique natural features do not succumb to the pressures of development.

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