NATURAL SYSTEMS LAND USE FEASIBILITY STUDY

FOR THE TOWN OF MIDDLETON, WISCONSIN

Prepared for

The Town of Middleton

By

James H. Zimmerman and Kenneth N. Hailing

Consulting Ecologists

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CHAPTER 1 INTRODUCTION

1.1 Argument for a Town Plan

Middleton town residents have sought to affect their own planning process in ways consistent with both federal and state constitutional provisions which grant authority in land use control to local governments, inalienably. They rightfully want to have something to say about development in their own neighborhoods. This right has been well substantiated by the courts, but is not administratively clear in Wisconsin, or in Dane County, because of an evolved over-reliance upon bigger government agencies and the presumed necessity for a central planning authority consisting of "expert" decision-advisors. The centralized (top down) planning idea was rekindled in the urban renewal and revitalization heyday of the 1960's and has now proven mostly not to work (as shown with the many project failures under HUD). Federal and state planning, at the time, became immersed in public policy issues (and politics), and lost all respect for human scale.

Perhaps our strongest complaint against the "quiet revolution" in land use reform is that it has diminished the importance of individual responsibility and local autonomy in planning. Based on a hierarchical, scientific decision formula, it led away from true economic accountability in land use (preventing an equitable land market and unfairly exploiting resource capital) and has thereby caused greater environmental depreciation in the long run. It is likely that the present rate of environmental disruption, accompanied by an even more costly breakdown of natural ecosystems (the decay often associated with urban sprawl), may actually be exacerbated by the regional planning process as we now know it. In matters pertaining to resource sustainability (that is, ecological stability), we therefore think our society should encourage a more home-based conservation land use ethic.

A renewed feeling of place and respect for the native working landscape should be established. The "town" would easily be rediscovered and improved upon as the neighborhood seat. Sensibility instead of arrogance should determine the design of human structures to make them both economically and socially fitting. Then, an authentic community plan, centered on human social wellbeing, would automatically be in harmony with nature (if ecological principles were followed in its design).

The Town of Middleton has moved constructively to reassert its identity by seeking direct landowner accountability in natural resource planning and management. We believe such efforts should be recognized by Dane County and not usurped to benefit monetarily powerful and separate outside interests. Given the current rapid urban expansion into the countryside, we also think other towns should begin to accept greater environmental planning responsibility. Even though there is legal precedent (courts have upheld local authority in zoning matters), town autonomy is not well recognized in Wisconsin. If you are a rural resident, not yet incorporated into an urban municipality, you have little to say independent of the county. Nonetheless, the rural population adjacent to cities is growing dynamically. Towns have the right to plan and zone under 61.35 Wis. Stets., but only if (a) the town board has been granted authority to exercise village powers (under 60.10 (2)(c), Wis.. Stats.) and (b) where, if the county has an ordinance, the town may draft its own, but only with county board approval.

(Zimmerman & Kailing, 1990)

Several of the towns in Dane County are at present contesting the county's authority to control rural land use on the grounds that the county ordinance fails to address important and growing rural land use issues. Decisions affecting protection of the environment are especially arguable. Many (as reported by the Wisconsin Towns Association) believe the county ordinance to be outmoded and no longer responsive to local needs. Its current implementation does not achieve the planning goals and objectives that the people desire, either from a social or environmental standpoint. Planning balanced neighborhoods amid healthy natural ecosystems is impossible, and even illegal, in many parts of the country due to ill-conceived zoning restrictions.

The voters in Middleton have expressed their environmental concern and support for local planning autonomy by electing officials that recognize the value of the town's rural amenities. Interested residents have begun to interact with the town's plan commission and to assist in the creation of a Master Plan. A majority of the local people have decided that the sights, sounds, and smells of the country should remain part of their natural heritage, and that stronger ecological principles should be reflected in the development of land and the management of natural resources (shown from survey results and personal interviews). Individual residents have invested their own time and money toward this end. We have been employed to help provide ecological input to the plan and to guide in its formation.

1.2 Resource Inventory and Evaluation

Our contribution to Middleton's 1990 Town Plan consists of a resource inventory and functional ecosystem assessment, combined as a natural systems land use feasibility study. The first phase of our natural resource planning involvement consists of the delineation of natural landscape units and the second phase follows with an ecological impact evaluation of these. The study is intended to help the Town discover land use alternatives which will allow for the functional integration of some of its natural biotic elements in present and future development plans, and to also balance local economic needs.

1.21 Description of Natural Ecosystems and Resource Requirements.

1.211 Ecosystem Definitions. An ecosystem may be thought of as a system where living organisms are inseparably interrelated with their nonliving environment and interact in selectively predetermined and thereby economically efficient ways. For our purpose we have defined ecosystems within the Town of Middleton broadly, as forests, grasslands, or wetlands, or some combination of these, and placed definitive emphasis on biotypes, and the biotic diversity of native plants and animals intrinsically identified within each of these major classes. A biotype is defined as a more specific association of plants and animals in a supportive physical setting (see Section 1.22). Our understanding is that the original, presettlement landscape was highly heterogeneous and that it has grown increasingly less so at each successive stage of human development. We now want to help reverse this trend, by identifying what remains and using the natural biotic diversity we discover to influence the pattern of future development in the Town.

Dynamic variability, not constancy, is the rule for ecological systems. This knowledge determined how we studied natural systems in Middleton and also, the perspective from which we derived our

(Zimmerman & Kailing, 1990)

landscape unit design and management recommendations. The approach to planning ecosystems is organic rather than mechanistic. Our premise is that it is not practical or desirable to try to regulate ecosystems. It is more advantageous to control social units of land according to the general requirements thought necessary for natural ecosystem sustainability.

To elaborate, since biological systems are a creation of environmental change over vast eons of time, their structures have grown exceedingly complex. They are thereby intrinsically adapted in specified ways that are not easily duplicated or modeled. Humans are equally adapted, similarly. We can only surmise as to the multitude of changes that occurred in Middleton's landscape following the last glacier, let alone the thousands, millions, and billions of years of biological evolution beforehand. Even so, we want something upon which to measure environmental quality and think ecosystems are a good place to start. Middleton's natural associations of plants and animals are not infinitely adapted. Time is a controlling variable so that species have evolved slowly. We know that what remains of the natural systems is still mostly determined by the original species organization and the selective links between species. Therefore, the present state of the town's ecosystems can be evaluated, to some degree, on the basis of what they were before settlement.

1.212 Natural Resource Planning Requirements. Although planners should be cognizant of the biological preconditions we have stated, species organization is not a workable base for land use control. One reason is that to try and model the structural complexity of even simple ecosystems is highly impractical (and perhaps impossible). Further, we believe such efforts are costly and unnecessary.

A more general assessment of ecosystems and an applied conservation ethic is sufficient for responsible stewardship. The stipulation is that adequate room and sufficient leeway be maintained for natural systems to operate. Our alternative to a structural analysis and rigid mapping of Middleton's resources has been a qualitative evaluation of the town's natural landscape from a biological point of view. To begin, we described Middleton's major ecosystems in general terms, and then used the ecological information we acquired from direct infield inspection of biotypes to support more specific design and management recommendations. The emphasis is on sensitive land management rather than species control, and our unit of management is an architecturally defined natural district and not a biotype (or other more synthetically bordered biological element such as a DNR wetland).

We started our investigation with an historic assessment of Middleton's ecosystems, to see how they had changed since settlement. From this knowledge, we were able to speculate on ways they could be altered through further development. Some kinds of disturbance would threaten species survival whereas other perturbance might provide benefits, depending on how the ecosystems were valued. We evaluated Middleton's ecosystems on the basis of their resource functions. Some of these functions included surface and groundwater storage, air and water quality improvement, support of wildlife, scenic beauty, and recreational and educational potential.

Because all natural systems show a great deal of redundancy, with many possible routes for the transfer of energy and information, they are able to withstand a good deal of interference (but not

(Zimmerman & Kailing, 1990)

indefinitely, as noted). We, therefore, began our inventory and functional assessment with a goal to preserve as many of these natural biotic avenues as we could. It has been shown that when the management of resources is directed toward maximizing individual species productivity (as with the selective management of tree plantations or game animals), species diversity is lost and the resiliency potential of an ecosystem is narrowed. The biological base of the resource is thereby less sustainable. In response to this concern, we decided to define the major ecosystem classes in Middleton very liberally.

1.22 Delineation of Natural Landscape Units.

With the completion of our historic overview of Middleton's landscape and the general characterization of its ecosystems, the focus of our study shifted to the delineation of natural landscape units, as our main task in the first phase of our study. As remarked, we did not attempt to map the major ecosystems as such, but we did use biotypes, as derivatives, to define the landscape units. A biotype was thought of as a specified regional associations of mostly endemic plants and animals together with their physical foundations and connections. Some examples of Middleton biotypes are oak savannas, southern lowland forests, southern mesic forests, wet prairies, sedge meadows, dry prairies, and cattail marshes. These were viewed as discrete biological elements within the larger categories of forest, grassland, or wetland. Originally they stretched across and filled up the normally heterogeneous town landscape.

Today, the natural landscape is artificially fragmented. Remnant biotypes are separated, or connected by constructed features such as ditches or hedgerows. We have, therefore, loosely referred to the margins, buffers, and connecting links where the biotypes meet as ecotones (or ecosystem gradients).

1.221 Landscape Unit Definition. Because the biotypes in our study are dynamic, interdependent living communities, and not contrived, static entities, they may be thought of as ecosystems of a different order (as the forests, grasslands, and wetlands have). We recognize all natural ecosystems as organic units with external links and boundaries that are unstable. They are really in constant flux. For this reason, accurate biotic boundaries are not easily ascertainable. Further, it is evident that land tenure patterns, rather than natural patterns, now control the distribution of species in the Town of Middleton. We thus concluded that ecosystems should not be mapped for land use control purposes. Our remedy was to join mutually supportive biotypes within flexible conservation zones, and to describe them as natural unite of the landscape, depending on their biotic constituency and base ecosystem functions.

We also tried to combine biotypes and delineate landscape units in a way thought complementary to the Middleton's overall resource planning and management goals. By placing biotypes within natural resource units that depict the natural character of the landscape, we think we have made them more contiguous, integral, and less easily fragmented. Our resource management emphasis is thereby directed toward comprehensive stewardship of larger land parcels rather than control of individual species or elements. The conservation zones, defined as landscape units, contain real biological entities

(Zimmerman & Kailing, 1990)

which are meant to determine land use feasibilities. In this respect they are unlike the more commonly employed conservancy areas or overlay zoning districts (used for Wisconsin floodplains and wetlands) which neglect to relate use to ecosystem sustainability.

The resource management scheme we have defined for the Town of Middleton allows for system adjustments by working with rather than against natural processes. It can also stimulate human ingenuity and might help preserve local autonomy in land use decision making.

Three hierarchical levels - Natural Resource Districts, Critical Natural Areas, and Sensitive Natural Sites - were selected for landscape unit delineation, in accordance with our conscientious natural resource planning approach.

1.222 Thematic Maps. Each of the landscape unit maps in our study depicts a separate level of organization for natural resource planning. Taken together, they provide a geographic base upon which to reference land use control decisions. The following is a summary description and construct of the three Natural Landscape Unit Maps. They are intended to be used with the Landscape Unit Evaluations presented in Chapter 4, to help formulate general conservation land use policies for the Town, and to provide an ecological base for more site-specific decisions governing development.

Summary Description of Landscape Unit Maps

A. Natural Resource Districts Map. This map describes major natural divisions in the landscape based on soils, land form, major groundwater recharge areas, surface drainage patterns, native vegetation and wildlife. One example is the Western Highlands demarcating the Johnstown Terminal Moraine. This district is typified by steep marginal slopes, boulders, pits, kettle potholes, a porus gravelly substrate, and oak woods, savanna, and prairie vegetation.

B. Critical Natural Areas Map. This map describes composite ecosystems within and across the Nine Natural Resource Districts. Smaller than the Districts, this unit provides an intermediate classification for the functional grouping of Sensitive Natural Sites. In so doing, it allows for broad conservation policies, not limited to the Districts, but still too general to be applied to the Sensitive Sites.

   Each Critical Natural Area can contain several Sensitive Natural Sites and be a significant ecosystem on the whole, providing environmental amenities such as wildlife habitat, scenic beauty and open space, surface and groundwater protection, and erosion control, and also economic benefits like a domestic agricultural base or facility for education and recreation.

   It is an area that performs a resource function of greater than local significance and where development could decrease its common value or even endanger public health and safety. Critical Natural Areas may: (a) be loosely associated

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with Resource Districts; (b) distinctly overlap one or more Districts; or (c) be confined to a specific District. An example is the more or less continuous corridor of oak forest, as the Trail Moraine Corridor, throughout the Western Highlands, Natural Resource District.

C. Sensitive Natural Sites Map. This Map describes the most fundamental land use districts for protection of natural ecosystems, as well as the preservation of unique landscape features like springs, rock outcrops, sink holes, historic monuments, and special vistas. Uncontrolled growth and development at these Sensitive Sites will result in a significant displacement of native plants and animals, irrecoverable damage to natural systems, and the accompanying loss of valued natural resource functions (for example, the purification of air and water). The cumulative impacts on Sensitive Sites will have area-wide significance.

   The Sensitive Natural Sites may be: (a) scattered individually throughout Natural Resource Districts; (b) scattered within separate Critical Natural Areas; (c) clustered separately within Critical Natural Areas; or (d) connected by corridors within and between Critical Natural Areas. Some examples are Timberlane Oak Forest, Driftless Oak Forest, and Knollwood Savanna, of Timberlane Block, of the Western Highlands. The biotypes are mostly oak forests, oak savannas, prairies, hedges, and shrub edges associated with the oak forest corridor of the Johnstown Terminal Moraine.

1.23 Landscape Unit Cumulative Impact Evaluation and Land Use Feasibilities

1.231 Natural Resource System Impacts. The second part of our study attempts to establish land use feasibility criteria for integrating the delineated, natural landscape units as resource management districts, in Middleton's Town Plan. Our comparative model was the presettlement condition of the landscape. Therefore, we returned to our historic overview to delimit, five conditions, or environmental phases in the recent, Holocene evolution of Middleton's landscape (that is, in the post-glacial period originating some 10,000 years ago). Again, our purpose was to discover how land use practice improved or diminished natural ecosystems in Middleton.

Before settlement human impact was more restricted, and the structure of the landscape was influenced by minor climatic events, prairie fires, and the foraging of herbivores. Traditional agriculture, set in place in the mid-1800s, modified drainage and introduced new species of plants and animals associated with dairy farming. Modern farming, established in the 40s and driven by federal government subsidies, began to alter the original landscape in significant ways through practices directed toward maximizing production of cash, grain crops (especially corn).

Also by the end of the War, the automobile, cheap energy, and the baby boom became factors causing rapid suburban expansion at the city's fringe. Open fields were rapidly replaced by a prefabricated network of square small-lots, concrete ditches, and asphalt roadways. Today, a combination of planned community developments and new estate homes is eating away the last of the natural resource base

(Zimmerman & Kailing, 1990)

throughout the country, with prime landscape features and remnant biotypes characterizing the most highly prized and coveted real estate.

We first noted the most significant ecological changes over time and evaluated cumulative impacts on the entire Middleton landscape, and on forests, grasslands, and wetlands more selectively. Next we defined ecosystem requirements in general terms and made broad plan recommendations accordingly. Then, in order to determine safe allowances for development within each landscape unit, we assessed discrete ecosystems more selectively in terms of their ecosystem functions (as resource attributes) and evaluated the cumulative impacts on their contained biotypes from both existing and potential land uses. By so doing, we tried to establish the ecological land use feasibility criteria which the Town could use to construct its plan. See Table 1 for a description of the natural resource system.

1.232 Conservation Land Use. As stated, our first step toward defining a land use feasibility construct was to establish some general planning guidelines for the Middleton landscape as a whole, as the forest, grassland, and wetland ecosystems, and then proceeded to delineate natural landscape units as the actual districts for land use control. For each natural landscape unit, at each of three levels of plan implementation, we incorporated bath the broad ecosystem requirements (for forests, grasslands, and wetlands) and our more detailed biological observations (for red oak forests, oak savannas, dry prairies, sedge meadows, sink holes, creek beds, hedgerows, outcrops, and other) in the criteria to be used for planning and decision making.

The Middleton ecosystems, characterized as forests, grasslands, and wetlands were described according to their: (a) unit area, size, shape, and continuity; (b) species diversity, associations, and types; (c) functional attributes; (d) impediments, encroachments, and impacts; and (e) land use affects, under both presettlement (as with use of fire by Indians) and present conditions. The broad design and management specifications (to be used to help create general town planning policies) were then drawn along with the monitoring requirements on the basis of policy goals and objectives complementary to ecosystem sustainability. These made up the first base rational for the land use recommendations expressed in our landscape unit evaluations.

An evaluation of existing and potential development impacts was then made within each natural landscape unit and compared with the assessed ecological functions and requirements of the resource (for sustainability), to determine land use feasibilities. The landscape units were evaluated according to the following conditions:

A. Primary Ecological Functions
B. Requirements for Sustainability
C. Existing Impacts
D. Potential Development Impacts
E. Preferred Uses
F. Acceptable Uses
G. Acceptable Means of Control

See Chapter 5 for the Landscape Unit Impact Evaluations.

(Zimmerman & Kailing, 1990)

1.24 Stewardship

The Town of Middleton has solicited help to plan the use of its resources in the best way. For our part, we have tried to initiate a more comprehensive and integral approach to resource planning by emphasizing the importance of natural biological systems and the resource functions they provide. We first needed to inventory the natural landscape elements remaining in the Town. In this initial investigation, we discovered native forest, grassland, and wetland remnants personifying a once bountiful landscape heritage. The natural ecosystems, even though now degraded, continue as necessary elements of the resource base upon which the Middleton residents as well as the residents of Madison depend. We therefore conclude that the remaining natural ecosystems are vital to the health of the region and that their topography, physical dynamics (water flow patterns for example), and original associations of plants and animals should remain intact.

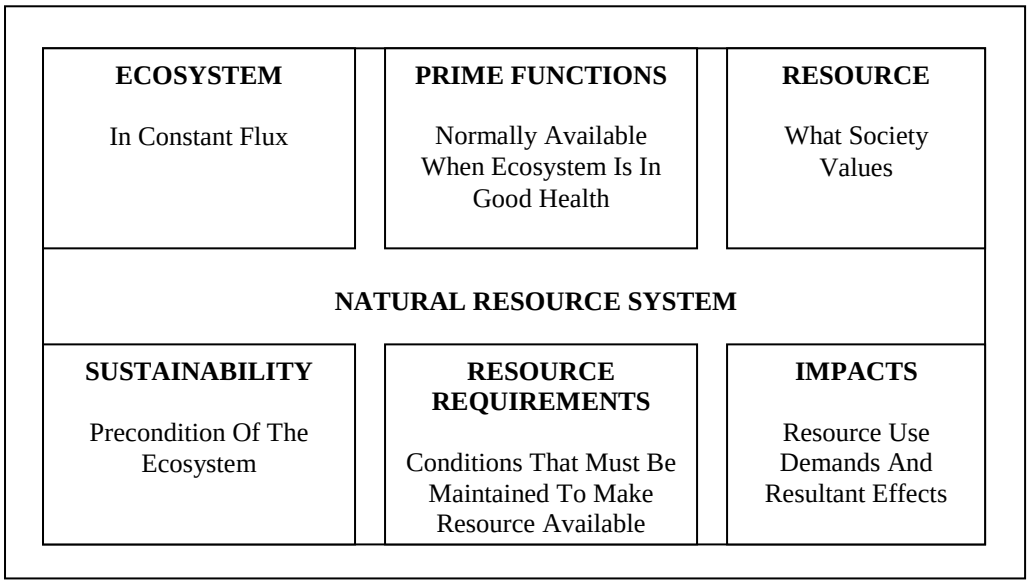
Our premise is that natural resource functions will be enhanced by preserving the integrity of Middleton's rural working landscape. Development should occur in harmony with the natural character of the landscape, utilizing ecological opportunities without disrupting the resource functions. The resource base definition should be expanded to- include all species and their natural associations, and new conservation practice should: extend over all properties (all erosion and surface runoff should be eliminated, for example).

Having become aware of rural degradation, society as a whole is finding an environmental conscience, and is now seeking to recover and enhance certain landscape amenities through stronger land use control. The federal government began this first regulatory phase of rejuvenation. Its efforts have been only partially_ successful, however, due mostly to the lack of local support. Middleton's environmental planning initiatives, therefore, show a significant move back to local responsibility in caring foot the 'and. As argued, we believe Strong local involvement, and incentives rather than more rules, are the key to better conservation land use.

Middleton might choose to protect certain biotypes within landscape units in their entirety, or restore, expand, and improve portions of them by special use agreements attached to future development contracts. Various public and private land use control devices are now available once a plan is adopted with sufficient biological detail (see Chapter 6).

(Zimmerman & Kailing, 1990)

Table 1. Natural Resource System



(Zimmerman & Kailing, 1990)

CHAPTER 2 BACKGROUND

2.1 Characteristics of the Town of Middleton Landscape

Middleton is a uniquely picturesque township with a good neighbor tradition reaching back to its first agricultural settlements by Yankee and Ohio pioneers over 150 years ago. Larger foreign-born populations began arriving in Wisconsin after the civil war. German immigrants, moving west from Milwaukee, were especially attracted to rolling hills and meadowlands that surrounded Madison. They made the first permanent impressions on the land, establishing the diverse, small farm dairy culture, still with us today. This gentle stewardship of the land allowed a working landscape pattern to develop that preserved natural systems. In some respects, the native environment became more diverse. Disruption of this ecological harmony, within both human communities and the, naturally evolved communities of native plants and animals, started when farms were forced to modernize. Now, rapid urbanization threatens to displace the rural foundation altogether.

The Town is its people, their attitudes and activities, and the external environment within which they live. For the most part, the people's sense of place is determined by their association with its physical elements. In Middleton, there remains an identification with, and an expressed pride in, the natural beauty of the local landscape. An unusual combination of climatic events determined the Town's presettlement formations.

The landscape in Middleton is still characterized by rolling uplands with remnant, marshy pot-holes, open prairie and oak savanna, and by steep wooded slopes, humped ridges and deep ravines connected to the broader, flat valley of Black Earth Creek. Clear flowing springs and fertile wetlands were once abundant throughout the this glaciated midland between the Yahara Lakes and the southwestern driftless area, stretching to the Wisconsin and Mississippi Rivers. The Town abounds in natural geologic features including rocky bluffs, sink holes, ravines, caves, and sandstone or limestone outcroppings. Several rare species depend on these remaining niches within the landscape.

2.11 Potential Development Impacts. Middleton's remaining forests, grasslands and wetlands, in particular, contribute to the pastoral image that many new residents want. Unfortunately, this idealized country setting, as portrayed by urbanites, is also most threatened by their own development actions. Therefore, some have joined concerned long term residents and responsibly sought to plan this development in ways that will incorporate and preserve the Town's most valuable natural systems. We have provided our ecological consulting services to help them do this.

2.12 Influx of New Population. Dane County continues to be a preferred place to live, shown by a growth rate greater than most other Wisconsin counties (1988, Wisconsin Department of Administration population estimates). Most of the increase in population has occurred in towns like Middleton that are directly linked to Madison within the metropolitan area. Along with this expansion has come the substantial increase in urban housing and the rapid extrusion of the urban infrastructure including, streets, and sewer, water and other utilities.

(Zimmerman & Kailing, 1990)

Subdivisions accompanied by new commercial and industrial development, are displacing valuable farm land. The creation of new suburban land parcels alone was up 28 percent in 1988 from the number recorded in 1986 (1989, Regional Trends by the Dane County Regional Planning Commission).

Smaller, Standard Metropolitan Statistical Areas (SMSAs), which far outnumber the larger-ones across the U.S., now show the greatest increase in population. Metropolitan areas similar to Madison, with populations between 100,000 and 300,000, grew the most between 1970 and 1980 (1987, Platt). This trend is likely to continue as more people seek relief from the pollution and congestion of the larger cities.

Ironically, it is the pastoral quality of the countryside that has brought people out, all the way from major cities like Boston and Chicago. Madison is unique in offering both an attractive rural setting and the cultural activities more common to large urban centers. The trouble is, the very enterprise of some of the new suburbanites threatens the rural identity many city people seek.

2.13 Change from Urban to Rural Land Use. Efforts to maintain an open rural landscape with pastures, fields and woodlots, as base to ensure the healthy environment that people move to Middleton for, seem to be losing ground to pressures for the kind of peace-meal urban development that disregards the importance of natural systems. At present the Town of Middleton locality provides ample clean air, water and natural open space. The availability of these expected amenities will be reduced, however, if the usual subdivisions, and commercial and industrial developments continue to displace farmland throughout natural water resource districts and in critical natural areas.

Farming, especially as traditionally practiced, has been one way to provide open space and protect certain natural systems. It has been the only affordable land use option (that is, the only one economically feasible in our current land market) for preserving the common public amenities of clean air, clean water, and scenic beauty, at a sufficient scale, in urbanizing areas. Park land is usually not adequate in size and not correctly designed for maintaining the necessary larger natural ecosystems.

2.14 Consequences of Urban Sprawl. A greater concentration of buildings and structures at the urban fringe is eliminating the buffering capacity of open farmland, but poor agricultural practice is still most to blame for the silting up the area's lakes and streams. This is because of the destructive farm practices exhibited by tenant farmers and speculators. Serious erosion and pollution occurs also as the result of new construction.

Total displacement of farmland in critical areas of watersheds and the paving over of absorbent surfaces is directly effecting the water quality in Madison's lakes. The lakes now suffer most from an inversion of the normal hydrologic system. Water that was once absorbed into soil and rock, and discharged as a steady, clean flow from springs, is now blocked by impervious surfacing. As a result, surface water flow has vastly increased in intensity and quantity, and the consequent discharge to lakes and streams is dirty. Increased pumping of municipal well water, subsequently diverted out of the aquifer through the Madison metropolitan sewerage facility, further depletes the groundwater resource.

2.15 Deprecation of Natural Ecosystems. Along with the depletion of air and water resources, caused by urban fringe development, has come an eroding of natural biological systems upon which the quality of human life depends. Whereas, traditional mixed farming practices lent a certain degree of ecological

(Zimmerman & Kailing, 1990)

balance to the rural landscape and preserved some natural systems, the combination of urbanization and industrialized agriculture now threatens to destroy our natural resource base entirely.

Agricultural systems, as a whole, are manipulated (not created) communities of plants and animals which interact with soils and climate in ways that are inherently unstable. How sustainable they are depends on factors such as base soil fertility, nutrient recycling and the diversity of plant and animal species under cultivation. Some of the characteristics of the early, enclosed field system, brought from Europe to Wisconsin, show how farm practice supported ecological stability and maintained various natural systems (of forest, woodland and grassland). Traditional farm practice in the Town of Middleton shows the preservation of natural landscape integrity through:

1. Nutrient input primarily from animals
2. Crop rotation and crop variety
3. The use of natural communities such as marshes, hedges and forests to offset nutrient output from harvest and depredations of pests
4. Intensive human labor for energy input to the system
5. Many, smaller farmsteads being situated in accordance with natural landscape features and availability of resources
6. Strong community ties and an identity with "place"

In contrast, modern industrial farming as practiced on the urban fringe in the Town of Middleton shows an almost total disregard for natural systems and natural landscape integrity through:

1. The use of nitrogen and other fertilizers (often with irrigation), in place of organic manures, to extend the productive capacity artificially over larger areas, often even onto marginal soils of very low fertility
2. The use of a few, highly productive plant hybrids in place of the more diverse but less productive plants of earlier times
3. The use of herbicides and pesticides to provide protection against pests over a broad range of a single crop such as corn, rather than protection provided by crop and livestock diversity, and by associated natural communities
4. Replacement of hand labor by machines and the use of non-renewable fossil fuel to provide energy not only for growing food, but also for its processing and distribution
5. Replacement of small 'family farms by larger commercial establishments, or. leased units, with the location of buildings.: and structures not dependent on natural landscape features or availability of resources
6. Fragmentation of communities and families, and the elimination of close ties between neighbors

However, urbanization not only continues the worst of the depredation of natural ecosystems, as evidenced by industrialized agriculture, but uses some of the same costly technology to sustain the newly constructed suburban landscape. This horticultural artifact is usually consumptive and sterile, providing few resource functions.

(Zimmerman & Kailing, 1990)

2.2 Integration of Natural Systems in Planned Developments

Given the present circumstance accompanying urban expansion as we have observed it in the Town of Middleton, that is, the escalating depreciation of the rural landscape and the degradation of natural ecosystems, we can easily see the need for a new conservation land use planning formula based on a conscientious land ethic. Such a new land ethic must be endorsed for and by the people if it is to work. It must also incorporate new way of designing and managing the urbanizing environment, finding a place both for agriculture within the working landscape, and residential, commercial, and industrial development, that integrates and preserves all the necessary ecosystem functions which support a viable resource base. Prosperity and our quality of life in Dane County will depend on this new formula.

Rather than close up the rural landscape, design should expand on the open space potentials that are intrinsic to the preservation of natural systems. Equally important is a more comprehensive design and management scheme that re-introduces open space and rural ecosystem elements back into the city (an urban natural systems revitalization and restoration program). A natural systems plan for the Town of Middleton is a start in this direction.

(Zimmerman & Kailing, 1990)

CHAPTER 3 NATURAL ECOSYSTEMS IN THE TOWN OF MIDDLETON

The natural ecosystems in the Town of Middleton can be divided into three general categories: (1) forests, (2) grasslands, and (3) wetlands. This chapter will provide a definition of each category, their functions, status in the Town, and requirements for sustainability.

1. FORESTS

1.1 Definition: Forests are tracts of over 1/4 acre, ideally 20-600 acres each, continuously dominated by trees. Biotypes of forest in the Town of Middleton include forests, savannas, fencerows, regeneration sites, and plantings.

2.1 Functions: These are the services or values which a healthy forest provides both to humans and to wildlife. A primary function is as an environment which is diverse and thereby helps promote species diversity on many levels. Another important function is soil erosion. Forests also provide landscape character, aesthetics, increase property values, provide screening, serve as recreational space, modify the climate, and provide usable products such as wood. They serve as areas of flood control and groundwater recharge. Fencerows provide animal cover for travel between fragmented forest blocks.

3.1 Status: Forests are abundant and well-distributed in the Town, accounting for considerable area in districts 1, 3, and 4. Fencerows abound in all districts. In general, the species diversity is currently good. Soil conditions range from good to poor. Widespread trends threatening deterioration include: (a) lack of oak regeneration; (b) soil erosion and compaction; (c) invasion of pest species; (d) overpopulation of herbivores such as deer; (e) construction damage; and (f) forest fragmentation and loss of acreage.

4.1 Sustainability Requirements: In general, those human practices outlined in the previous point should be curtailed and/or remediated, e.g., eroding sites must be repaired, no mowing, grazing, trampling, using of machinery in the forest. Alien and overpopulated species must be controlled. A no-net-loss policy for numbers and species of trees and their acreages should be established in each district. In particular, regeneration sites should provide for oaks and white birch, savannas should have fire re-introduced as a means of management, and special care should be given to provide sufficient habitat for birds, mammals, amphibians and reptiles. Develop land use and design specifications that will help integrate subdivision growth with existing forests--set aside large forest blocks and corridors, divert or detain all surface water runoff, protect root zones from construction equipment, require supervision of work. Monitor the health of the ecosystem by taking periodic counts of species, age. Also check regeneration, erosion, birds, and groundcover, and pest species.

2. GRASSLANDS

2.1 Definition: Grasslands are largely treeless, shrubless expanses of land dominated by grasses and associated herbaceous vegetation. Biotypes in the Town of Middleton are native prairie vegetation (including "goat" prairies and railroad prairies), grassland animal habitats, and prairie regeneration sites.

2.2 Function: Grasslands have value in a variety of subtle ways. In an of themselves they are attractive, providing a unique habitat for birds, insects, and mammals. Their flora have been

(Zimmerman & Kailing, 1990)

valued in horticulture, landscaping, crop development, pest control, and for medicinal uses. As a historical landscape they offer an interesting educational opportunity. Prairie grasses are excellent soil conditioners and provide erosion control as well. They provide habitat diversity, and stability of that diversity. They also function well in preserving a low-maintenance scheme for open space preservation.

2.3 Status: Both prairie plants and animals have nearly been extirpated from the Township. Small relics of 0.5-2.0 acres of "goat" prairies persist along the bluffs in districts 1 and 7, in a few fencerows such as in district 4, and along the-rail corridor in district 1 (although construction recently removed much of the prairie cover). In all sites, weedy and woody vegetation threatens what little prairie remains. Prairie fauna is also in danger since it has so little habitat left. However, some species, like the short-eared owl, harriers, badgers, and Franklin's ground squirrel could be restored in existing open space. Others tenuously persist in CRP lands.

2.4 Sustainability. Requirements: In general, the prairies need protection from damaging human disturbances. The need to be managed with controlled burns, weeding, or mowing to help remove alien and woody species. Restoration techniques exist to return lost species and acreages to their former status and could be implemented. Monitoring of existing and restored plant species, and the extent of alien and woody invasion should be done periodically. For prairie vertebrate species, especially birds, the key requirement is consistently maintaining a 120 acre expanse of unmowed, open grassland in a district to support a viable population of about 20 species. Unmowed areas of golf courses, waterway buffer strips, roadside rights of way might also qualify. Relic tracts of prairie should be given scientific reserve status with special covenants on both public and private lands with monitoring and policing by responsible, knowledgeable neighbors. Construction safeguards such as with forests should be put in place.

3. WETLANDS

3.1 Definitions: Wetlands are any low places in the landscape where you can get wet feet but you can't swim. The soil is soggy (waterlogged) for more than a week in summer but the water is not too deep for emergent plants to grow. Among a diversity of biotypes of wetland, the Township has a floodplain forest, marshes, peatlands, waterways, sinks, and ponds.

3.2 Functions: The primary function of wetlands is to maintain species and landscape diversity. Wetlands reduce flood peaks and erosion where shallow slopes and vegetation spread and detain flood flows. They also filter pollutants where these are not excessively damaging to wetland. Historic record of climate, fossils, and other archaeological materials are preserved in peat and other sediments. Provide corridors of covet and habitat for traveling and breeding animals.

3.3 Status: The Township currently has virtually no functioning wetlands. Fortunately, restoration and enhancement is very possible.Whereas uplands must be expensively replanted for restoration, wetlands often regain their characteristic species automatically once water levels are returned to the correct depths. Opportunity for large wetland restorations exist in districts 1 and 2. Along with numerous examples elsewhere, small relic pockets of wetland vegetation remain to indicate what species would likely return.

(Zimmerman & Kailing, 1990)

3.4 Sustainability requirements: The guidelines are simple: keep shorelines gradual (1-5 % are ideal); put the water back to the correct level; retrain pollutants (silt, organics, fertilizers, toxics) in the input water. Each wetland type has special water level regime requirements and water quality tolerances. Since wetlands occupy floodplains, they should already be zoned conservancy, and not developed. The conservancy status should include buffers of natural vegetation of 30-300 feet wide around sides, including all ponds, sinks, and waterways. Good upland management in the entire Township will protect wetlands and allow them to enhance the overall water quality. As they pertain to the cold water-loving trout in Black Earth Creek, the wetlands restorations in the headwaters will on balance be a large asset, even though retrained water is warm, since reducing pollution and flood damage (silt) is another requirement of good trout habitat.

(Zimmerman & Kailing, 1990)

CHAPTER 4 DISTRICT, AREA AND SITE LISTS Natural Resource Districts:

Badger Mill Creek Slopes: (Alphabetic)

Central Basin.
Driftless Slopes.
Glacial Lake Middleton Basin.
North Fork Pheasant Branch Countryside.
South Fork Pheasant Branch Creek Countryside.
Sugar River Basin.
Upper Black Earth Creek Gateway.
Western Highlands.

Critical Natural Areas: (Alphabetic)

Badger Mill Creek Rims.
Big Ravine Oak Forest, Savanna, Prairie.
Big Verona Block.
Black Earth Creek Gateway.
Deer Run Island.
Glacial Lake Middleton.
Historic Church.
Internally Drained Areas.
North Line.
North Rim Rocky Dell.
North Rim Black Earth Creek.
Northwest Block.
Quarry Island.
Richardson Cave Block.
School Island.
South Rim Black Earth Creek.
South Rim Rocky Dell Forest And Buffers.
Sugar River Basin.
Timberlane Block.
Trail Moraine Corridor.

Sensitive Natural Sites: (by map-code number)

1 North Line Forest.
2 Evergreen Oak Forest.
3 St. John Oak Forest.
4 Schewe Oak Forest.
5 Timberlane Oak Forest.

(Zimmerman & Kailing, 1990)

6 Schoolview Forest.
7 Northeast Nineteen Oak Forest.
8 Five Sinks Oak Forest.
9 Fencerow Oak Forest.
10 Quarry Oak Forest.
11 South University Farms Forest.
12 West South Fork Pheasant Branch Creek Forest.
13 Northwest Church Forest.
14 Industrial Park Forest.
15 Elderberry Oak Forest.
16 Dellwood Hill Oak Forest.
17 Bruner Road Forest.
18 Enchanted Valley Forests.
19 Big Ravine Oak Forest.
20 Highpoint Oak Forest.
21 Elver West Oak Forest.
22 Highpoint Midtown Oak Forest.
23 Thirty-three Southwest Oak Forests.
24 Applewood Oak Forest.
25 Verona Block Oak Forest.
26 Gordon Oak Forest and Waterway.
27 South Point Oak Forest.
28 Valley View Oak Forest.
29 Richardson Cave Oak Forests.
30 Driftless Oak Forest.
31 Gateway Savannas.
32 Island Savanna.
33 Moraine West.
34 Cemetery Savanna.
35 St. Peter Savanna.
36 Blackhawk Homestead Savanna.
37 Middleton Junction Savanna.
38 Mineral Point Savanna.
39 Maple Lane Savanna.
40 Applewood Oak Savanna.
41 Knollwood Savanna.
42 Rocky Dell Oak Forest And Savannas.
43 Big Ravine Oak Savannas.
44 Highway 14 Savannas.
45 Landfill Savanna.
46 Airport Road Oak Savanna Restoration Site.
47 West Middleton Settlement Forests and Savanna Restoration Sites.
48 Hilltop Oak Forest Savanna Restoration Site.
49 South School Oak Savanna Regeneration Site.

(Zimmerman & Kailing, 1990)

50 North Church Oak Savanna Restoration Sites.
51 South Rim Oak Or Savanna Regeneration Site Series.
52 Elver South Oak Savanna.
53 Highpoint 'Midtown Oak Savanna Restoration Site.
54 Cherrywood Oak Forest and Savanna Restoration Sites.
55 Twin Valley Oak Forest Savanna Restoration Site.
56 Applewood Oak Savanna Restoration Sites.
57 Northeast Thirty-three Oak Savanna Restoration Site.
58 Valley View Oak Savanna Restoration Site.
59 South Church Oak Savanna Restoration Sites.
60 Driftless Oak Forest Savanna Restoration Sites.
61 Knollwood Oak Forest Savanna Restoration Sites.
62 Tumbledown Oak Savanna Regeneration Site.
63 Quarry Island Oak Savanna Restoration Site.
64 St. John Oak Forest And Savanna Restoration Sites.
65 Airport Road Savanna and Oak and Prairie Restoration Site.
66 Enchanted Valley Oak Savanna Regeneration Sites.
67 Rocky Dell Oak Savanna And Oak Forest Regeneration Sites.
68 South Rim Mixed Forests.
69 Deer Run Island.
70 Quarry Island Mixed Forest.
71 South Rim Rocky Dell Walnut Forest.
72 Twin Valley Forest.
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76 Rocky Dell Goat Prairies.
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79 Rail Trail Prairie Restoration Site.
80 Reserve Prairie Restoration.
81 St. Peter Rim Prairie Restoration Site.
82 Landfill Prairie Restoration Site.
83 West Middleton Elementary School Prairie Restoration Site.
84 Lake Middleton Peatlands.
85 Gateway Marshes Restoration Site.
86 Powerline Carrs Restoration Site.
87 Creek Meadows Restoration Site.
88 Highway 14 Wet Forest Restoration Site.
89 Old Sauk Wet Forest Restoration Site.
90 Ditch Wet Forest Restoration Site.
91(a) North Line Ponds Restoration Site.
91(b) North Fork Pheasant Branch Creek Wet Forest Restoration Site.

(Zimmerman & Kailing, 1990)

LANDSCAPE UNIT EVALUATIONS FOR

Natural Resource Districts
Critical Natural Areas
Sensitive Natural Sites

AS PART OF THE NATURAL SYSTEMS LAND USE FEASIBILITY STUDY

FOR THE TOWN OF MIDDLETON, WISCONSIN

Prepared for

The Town of Middleton

By

James H. Zimmerman and Kenneth N. Sailing

Consulting Ecologists

June 1990

(Zimmerman & Kailing, 1990)

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(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON NATURAL RESOURCE DISTRICT EVALUATIONS

District Name: Upper Black Earth Creek Gateway.

Map Key: 1

Sections: 7, 8, 9 and parts of 3, 4, 5, 6, 10, 16, 17, & 18.

District Characteristics: The upper section of the wide, east-west valley of Black Earth Creek.

Topography: Nearly flat valley floor draining westward between north and south rims of 200-foot bluffs, includes two island bluffs, side valleys, and many ravines.

Geology: A pre-glacial valley, cut in Lower Magnesium limestone with its head widened by glacial drainage and its floor filled by pitted glacial outwash.

Vegetation: On the valley floor--native tallgrass prairie, marsh, peatlands, and kettle ponds--at present, mostly drained and cleared for agriculture by ditching; On the bluff slopes--native prairie and oak savanna on south-facing slopes, mixed forest on north slopes and in the ravines; On bluff tops--wooded, partly cleared for agriculture and residences.

Soils: On the valley floor--deep strata of gravel, sand, clay, silt, and some peat; On the bluffs--thin, erodible loams.

Hydrology: Surface drainage and erosion exacerbated by gullies and ditches; groundwater flow emerges in ditched creek and in seeps lying below the bluffs. This flow is probably lowered current land use.

Natural History: A large, diverse ecological unit with continuous natural corridors and interwoven biotypes. It remains in a reasonably healthy natural condition.

Scenic Beauty: A maximum diversity of topographic, rural, and working landscapes which are outstanding on all scales; provides high quality vistas and viewsheds and the potential for major recreational uses. Blight at present is localized.

Historic Importance: Glacial features of statewide significance; could serve as a benchmark for presettlement landscapes, biotypes, and subsistence pioneer agriculture.

Most Important Natural Resources (all of equal value): a) sustainable biotic and species diversity (75 % of which occurs in Sensitive sites); b) headwaters of world-class trout stream; c) restoration potential for extirpated fish and wild game populations; d) sustainable balance of land uses with scenic, ecological, and historic resources; e) gene bank of threatened and endangered species; opportunities for research and restoration.

Priority Land Use Objectives: Recreation, education and research, recreation-orientated transportation, access, and protection. Appropriately scaled integration of land uses emphasizing cultural values as well as national natural, historic, and scenic landscape features.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: Black Earth Creek Gateway.

Map Key: K Resource District: 1

Quarter Sections: SW & SE 7, SW & SE 8, NW & NE & SW 9, NW & NE 17, & NW & NE 18.

Sensitive Sites: Wetlands---85, 86, 87; Prairie--79; Wet Forest--88, 90.

General Description: The valley floor with its ditched creek, drained wetlands, ponds, and relic prairies, and farmland with a few relic pockets of native flora and fauna.

Biotypes: wet marsh, peat meadow and shrub cart, temporary ponds, trout stream, wet forest, tallgrass prairie, and wet prairie.

Watershed Characteristics: Setting--flat floor surrounded by bluffs and steep gullies; Input Area--4.5 square miles; Output--Black Earth Creek to the Wisconsin River.

Slopes: 1%

Soils: Radford, Sable, Elburn, Virgil, Marshan, Plano, and McHenry silt loams (wet, over gravel); alluvium; some Wacousta loam, Granby sandy, and deep Houghton muck (or Peat).

Land Uses: Dairy and beef cattle farms and croplands; 80 acres of industry in NE 1/4 Section 9.

Most Important Natural Resources: Trout stream; restorable marshes, peatlands, ponds, wet forest, and wildlife habitat (especially for water birds); restorable prairie vegetation along railroad and highway right-of-ways.

Natural Resource Management Requirements: Wetlands—Restore appropriate water levels with water control structures; Prairies--control alien species and invading brush.

Priority Land Use objectives: Protection and enhancement of native fish, game, waterbirds, amphibians, raptors, furbearers, and other endangered animals as well as native prairie plant species.

Means of Control: Overlay zoning of the entire area as floodplain and wetland; implementation and enforcement of erosion and water quality management requirements in the entire watershed.

Monitoring Requirements: a) water quality in the creek; b) a portion of the overall area for both surface and groundwater levels; c) species diversity appropriate to each biotype; d) pest species populations in each biotype; and e) amphibian and fish species populations.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 85 Gateway Marshes Restoration Site.

Map Key: 85 Resource District: 1 Critical Area: K

Quarter-Quarter Sections: NW/NW 10 (10 acres), NE/NE 9 (20 acres), SW/NE 9 (40 acres), SE/NW 9 (10 acres), NE/SW 9 (30 acres), NE/NE 17 (20 acres), & NW/NE 17 (20 acres).

Total Acres: 150

Biotypes: Marsh and ponds (drained at present).

Slope: 0-1%

Important Functions and Values: When restored this site can function as a) a life support system on-site for water birds, b) as an beneficial influence to the downstream trout habitat, and c) as, a continuous recreation corridor.
Present Condition: Drained cropland which is subject to flood damage and which causes downstream pollution of the trout stream.
Preferred Uses: A conservancy of restored floodable cropland to natural marsh and waterbird habitat.
Acceptable Uses: Combination of low-impact agriculture along with some wetland restoration.
Means of Control: a) floodplain zoning to exclude mining and building in wetlands; and b) public or private purchase (or easements) for wetland preservation and restoration.
Monitoring Requirements: Hydroperiods, water quality, populations of indigenous marsh and pond flora and fauna (especially amphibians and waterbirds), and vegetation-water interspersion ratio.
Additional Notes and Sources of Information:
--The U. S. Fish and Wildlife Service offers assistance in wetland restoration techniques and water control structures, even on private land.
--See appendices-for-marsh plant and animal species list.
--This is an opportunity not only to restore waterbird populations in the Township, but also to assist in the recovery of declining waterbird populations on a continent-wide basis. Such an effort would also help the amphibious species and enhance the Black Earth Creek trout fishery.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 86 Powerline Carrs Restoration Site.

Map Key: 86 Resource District: 1 Critical Area: K.

Quarter-Quarter Sections: SW/SW 9 (30 acres), SE/SE 8,(30 acres), NW/SE 8 (10 acres), NE/SW 8 (20 acres), & NW/NW 16 (4 acres).

Total Acres: 94

Biotypes: Shrub Carr peatland (presently mostly drained, cleared and farmed).

Slope: 0-1%

Soil: Houghton muck (peat).

Important Functions and Values: These are peatlands, indicating an enduring groundwater discharge site The vegetation, especially shrub, supports many bird species, e.g., woodcock and songbirds. If restored, the downstream water quality will improve and wildlife will increase. This area is also Part of a potential recreation corridor.

Present Condition: Most of the area is drained for agriculture, but peatland agriculture is not sustainable because the peat decays and erodes downstream.

Preferred Uses: Conservancy for the restoration of the peat or muck soil area to natural wetland, probably shrub carr, but could include marsh, wet meadow and wet prairie as well.

Acceptable Uses: Phase-out agricultural use over time while incrementally restoring wetland areas.

Means of Control: a) floodplain zoning to exclude mining or building in wetlands; b) public or private purchase (or easement) for wetland preservation and restoration.

Monitoring Requirements: Hydroperiod, water quality in stream and remaining ditches, populations of indigenous fauna and flora, and pest species (especially plant).

Additional Notes and. Sources of Information:

--Native shrubs, ground plants and birds of carrs remain in corners such as SWSW 9 and extreme NWNW 16 near the powerline.

--See appendices for plant and animal lists for peat carrs.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 87 Creek Meadows Restoration Site.

Map Key: 87 Resource District: 1 Critical Area: K

Quarter-Quarter Sections: Meadows--NE/NE 18 (20 acres), NW/NW 18 (20 acres), SE/SW 7 (20 acres), NW/NW 7 (20 acres); Ponds--(1) Center 8, (2, 3) NE/SW 8, (4) SWSW 8, (5, 6) NE/NE 18, (7) NW/NW 7 (7 total acres); & Ditched Creek--From Hwy. 14, at Center of 9, to N. of Hwy. 14 at west boundary of NW/ SW 7 (3 acres).

Total Acres: 50

Biotypes: Wet sedge meadow and ponds (presently mostly drained including a ditched stream).

Slope: 0-1%

Important Functions and Values: When restored, the site will function as a) an on-site biotic support system; b) as a beneficial influence on downstream water quality; and c) as part of a potential recreational corridor.

Present Condition: Deep ditch through pasture and brush; much reed canary grass and little wildlife. Some ponds are still in good condition.

Preferred Uses: Conservancy fox• restoration of stream ditch and associated wetlands to natural topography and wetland habitats, especially the wet sedge meadow.

Acceptable Uses: Phase-out agricultural use over time while incrementally restoring wetland areas.

Means of Control: a) floodplain zoning to exclude mining or building in wetlands; b) public or private purchase (or easement) for wetland preservation and restoration.

Monitoring Requirements: Hydroperiod, water quality in stream and remaining ditches, populations of indigenous fauna and flora.

Additional Notes and Sources of Information:

--Important animal life of sedge meadows includes snipes, rare grassland songbirds, raptors, and amphibians. Wet meadows grade into wet prairies with additional valuable native plant species. Sedge meadows and wet prairies are excellent for flood storage and fine-tuning of water quality.

--See appendices for plant and animal lists for sedge meadows.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 88 Highway 14 Wet Forest Restoration Site.

Map Key: 88 Resource District: 1 Critical Area: K

Quarter-Quarter Sections: NE/SE 8 (5 acres), SE/-NE 8 (5. acres).

Total Acres: 10

Biotypes: Floodplain forest.

Slope: 0-1%

Important Functions and Values: Support for wetland forest plant and animal species; functions despite siltation and high water levels.
Present Condition: Invasions of Boxelder, Chinese Elm, Hackberry, Mulberry, Green Ash, here and elsewhere, on spoilbanks displace the species that belong in this community.
Preferred Uses: Conservancy for flood storage and wildlife; screens and buffers at floodplains and waterways.
Acceptable Uses: Continued agricultural use.
Means of Control: Wetland Conservancy.
Monitoring Requirements: Populations of indigenous and alien plant species; soil stability; pollution sources.
Additional Notes and Sources of Information:
--Other sites might be as appropriate, or even more appropriate, as experience pinpoints areas where flood storage requires water level fluctuation and silt deposition.
--See appendices for species list for wetland forests (birds tend to use both upland and bottomland forests).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 90 Ditch Wet Forest Restoration Site.

Map Key: 90 Resource District: 1 Critical Area: K

Quarter-Quarter Sections: NW/NW 17, NE/NW 17, NW/NE 17, & NE/NE 17 (10 acres).

Total acres: 10

Biotypes: Floodplain forest.

Aspect: South and North.

Slope: 0-60%

Important Functions and Values: Supports wetland forest plant and animal species, and retains wetland functions despite siltation and high water levels.
Present Condition: Invasions of Boxelder, Chinese Elm, Green Ash, on spoilbanks typifies appropriate vegetation on unstable wetsoils.
Preferred Uses: Wetland conservancy for flood storage, wildlife, and screens in floodplains, with emphasis on improved erosion control.
Acceptable Uses: Continued agricultural use.
Means of Control: Wetland Conservancy.
Monitoring Requirements: Populations of indigenous and alien plant species; soil stability; pollution sources.
Additional Notes and Sources of Information:

--Allow trees on steep banks only where banks cannot be made less steep. Trees cannot prevent erosion on waterways. Grasses and sedges are better at stabilizing soil, but don't tolerate shade, siltation, or water level fluctuation.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 79 Rail Trail Prairie Restoration Site.

Map Key: 79 Resource District: 1 Critical Area: K

Quarter-Quarter Sections: Railroad and Highway 14 rights-of-way through Sections 7, 8, and 9.

Total acres: 10

Biotypes: Tall grass prairie and wet prairie. Aspect: South, North and level.

Slope: 0-30%

Important Functions and Values: Supports prairie plant and animal species, functions as a gene bank, stabilizes soil on slopes and has the potential as a recreational trail corridor.

Present Condition: Until recently, this site contained over 200 native prairie species. However, construction activities by the DOT and the railroad destroyed nearly 50% of the original vegetation and furthermore, allowed for an invasion of field weeds and brush. These aliens need to be controlled in order that the remaining native species can re-colonize the area.

Preferred Uses: Conservancy for the preservation and restoration of natural prairie.

Acceptable Uses: Transportation corridor with maintenance standards that encourage native prairie species and prevent invasion by field weeds and brush.

Means of Control: Native prairie management plan with active supervision; purchase of rights-of-way.

Monitoring Requirements: Populations of indigenous and alien plant species; soil stability.

Additional Notes and Sources of Information:

--Prairie vegetation, if undisturbed, is maintenance free and salt-tolerant.

--Grassland wildlife requires larger acreages of meadow or hayfield but does not require native plant species.

--See appendices for prairie plant list.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: South Rim Black Earth Creek.

Map Key: H Resource District: 1

Quarter Sections: SW 9, NW 10, NW & NE & SW &SE 17, NW, NE & SW 18.
Sensitive Sites: 10, 52, 69, 73.

General Description: A corridor of steep, mostly wooded slopes along the south side of the upper Black Earth Creek valley; some open old fields and pastures, small residential areas, and a stone quarry.

Biotypes: Mixed forest with some cleared fields.

Watershed Characteristics: Setting--North-South facing bluffs and ravines; Input Area--approximately 1400 acres; Output--Black Earth Creek.

Slopes: 10-60%

Soils: Dodge, Kidder, New Glarus, Sogn, Whalen, and McHenry silt loams (all very erodible on steep slopes). Land Uses: Some pasture but majority is wooded.
Most Important Natural Resources: Outstanding forested areas provide shelter to a variety of upland fauna. Rim provides exciting scenic viewshed with numerous vistas. When not disturbed, the area conserves both soil and water.
Natural Resource Management Requirements: Forests—Control erosion; Edges and steep clearings--Forest regeneration; Both--control alien species, e.g., deer and buckthorn.
Priority Land Use Objectives: Preserve in natural state as much as possible, restricting all development on steep slopes.
Means of Control: a) conservancy zoning for forests and-slopes; b) setback and subdivision specifications; c) public or private purchase (or easements).
Monitoring Requirements: a) surface runoff and erosion, especially gullyheads and groundcover; b) plant and animal species diversity; c) pest species populations; e) screening of buildings.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 69 South Rim Mixed Forests.

Map Key: 69 Resource District: 1 Critical Area: H

Quarter-Quarter Sections: NW/NW 16 (30 acres), acres), SE/NE 18 (40 (10 acres), NE/SE 18 (20 acres), SW/NW

Total acres: 310

Biotypes: Mixed deciduous species).
Aspect: North, Northwest, SW/SE 9 (10 acres), SW/SW 9 (20 acres), NE/NE 17 (20 acres), SE/NW 17 (20 acres), SW/NE 18 (40 acres), NW/SE 18 (30 acres), NE/SW 18 (40 acres), NW/SW 18 (30 acres).
Total acres: 310

Biotypes: Mixed deciduous forests (oaks and other indigenous tree and Northeast.

Slope: 10-60%

Important Functions and Values: Life support for a diversity of interdependent forest plant and animal species; outstanding viewsheds and vistas; gene bank for regeneration; and soil and water conservation (when not adversely impacted).
Present Condition: The area ranges from good to poor (based on the amounts of erosion and alien species), but the wooded corridor is still fairly continuous and able to regenerate indefinitely with good management.
Preferred Uses: Conservancy or recreation for all or part, with enough of the steeper slopes preserved to maintain an unbroken scenic and wildlife corridor' along the south rim.
Acceptable Uses: Low density residential use provided necessary design steps (clustering, setbacks, neighborhood reserves, screening) are taken to assure and maintain the wooded slopes and corridor.
Means of Control: Subdivision requirements and review processes, careful soil and water management, neighborhood cooperation, and scenic easements.
Monitoring Requirements: Populations of indigenous and alien plant species; soil stability; continuity of forest corridor, screening of buildings, and forest regeneration.
Additional Notes and Sources of Information:
--Summer monitoring needed for baseline biotic inventory.
--See appendices for list of expected plant and animal species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 73 Twin Valley Forest.

Map Key: 73 Resource District: 1 Critical Area: H

Quarter-Quarter Sections: SE/NE 17 (40 acres), SW/NE 17 (20 acres), NW/SE 17 (10 acres), NE/SW 17 (40 acres), NW/SW 17 (40 acres), SW/NW 17 (40 acres).

Total acres: 150

Biotypes: Oak woodlands, also separate plantings of black locust and conifers.

Aspect: North and Northeast.

Slope: 20-40%

Important Functions and Values: Life support and scenery.

Present Condition: Mostly natural in appearance, but this large block in the south rim forest corridor is low in overall biotic diversity.

Preferred Uses: Conservancy or• recreation for all or part, with enough of the steeper slopes preserved to maintain an unbroken scenic and wildlife corridor along the south rim; restoration of native biotypes.

Acceptable Uses: Residential use provided necessary design steps (clustering, setbacks, neighborhood reserves, screening), based on resource performance standards, are taken to assure and maintain the wooded slopes and corridor.

Means of Control: Subdivision requirements and review of permits according to specific environmental standards; soil and water management, neighborhood cooperation.

Monitoring Requirements: Populations of indigenous and alien plant species; soil stability; continuity of forest corridor, screening of buildings, forest regeneration.

Additional Notes and Sources of Information:

--Appropriate residential density requirements,- and setbacks, for protection of slopes and forest corridors should be established and adhered to

--Scenic easements are especially suited to this area.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 52 South Rim Oak Or Savanna Regeneration Site Series.

Map Key: 52 Resource District: 1 Critical Area: H

Quarter-Quarter Sections: All cleared gaps in, and upper edges of, south rim forest corridor. For example, SW/SE 9 (40 acres), SE/SE 9 (20 acres), NW/SE 9 (20 acres), SE/SW 9 (40 acres), NE/SW 9 (10 acres), SE/NW 17 (30 acres), NW/SE 18 (20 acres), NW/SW 18 (20 acres).

Total acres: 200

Biotypes: Old fields, pastures, and eroding forest slopes.

Aspect: North.

Slope: 20-40%

Important Functions and Values: When restored, this area can serve as habitat for a diversity of interdependent forest and forest edge plant and animal species; outstanding viewsheds and vistas; gene bank for regeneration; and soil and water conservation (when not adversely impacted).

Present Condition: The area ranges from good to poor (based on the amounts of erosion and presence of alien species).

Preferred Uses: Conservancy for all or part with oak regeneration, forest continuity, and protected slopes a long -term goal.

Acceptable Uses: Residential use provided necessary design steps (clustering, setbacks, neighborhood reserves, screening), based on resource performance standards, are taken; also, lot conservation plans that encourage oak regeneration and maintenance of viewsheds.

Means of Control: Subdivision requirements and review of permits according to specific environmental standards; soil and water management, neighborhood cooperation, and public or private purchase of land (or easements).

Monitoring Requirements: Populations of indigenous and alien plant species, soil stability; continuity of forest corridor, view access and screening of buildings, and oak regeneration.

Additional Notes and Sources of Information:

--Oak regeneration is a useful byproduct of natural landscaping along with soil and water management. The cleared gaps are ideal for this along with maintaining views among the growing trees. Many birds benefit for habitats created by allowing to move out into the old fields and pastures.

--Both conservation and scenic easements are especially suited to this area.

--See appendices for list of expected plant and animal species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 10 Quarry Oak Forest.

Map Key: 10 Resource District: 1 Critical Area: H

Quarter-Quarter Sections: SE/SE 9 (30 acres).

Total acres: 30

Biotypes: Oak forest.

Aspect: North.

Slope: 30%

Important Functions and Values: Life support for a diversity of - interdependent forest plant and animal species; outstanding viewsheds and vistas; gene bank for regeneration; and soil and water conservation (when not adversely impacted); screening of quarry.

Present Condition: Fair--some erosion.

Preferred uses: Conservancy or recreational.

Acceptable Uses: Residential use provided necessary design steps (clustering, setbacks, neighborhood reserves, screening), based on resource performance standards, are taken to maintain the forest intact and likewise improve water quality.

Means of Control: Subdivision requirements and review of permits according to specific environmental standards; soil and water management, neighborhood cooperation, public or private purchase of land (or easements).

Monitoring Requirements: Populations of indigenous and alien plant species, soil stability, and connectivity to other south rim-forests-screening of quarry oak regeneration.

Additional Notes and Sources of Information:

--This block is at the east end of the south rim forested slope corridor.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: Big Ravine Oak Forest, Savanna, Prairie.

Map Key: F Resource District: 1

Quarter Sections: NE 7 (20 acres), NW 7 (20 acres), SW 7 (40 acres), SE 7 (30 acres).
Sensitive Sites: 20, 44, 78(a), 78(b); with 20, 44 - grassland and 78(a) and 78(b) - forest.

General Description: A large, unbroken block containing as an integral unit, an oak forest, two large goat prairies, a deep ravine, and buffers around edges and above slopes.

Biotypes: Oak forest, lime prairie, oak savanna.

Watershed Characteristics: Input Area--approximately 220 acres; Output--Black Earth Creek.

Slopes: 20-60%

Soils: In the valley, New Glarus and Dunbarton silt loams, erodible; on the bluffs, Stony soil and Kidder loam, erodible.
Land Uses: Natural state; undeveloped.
Most Important Natural Resources: Outstanding wild block of uninterrupted naturally vegetated ravine between two bluffs of prominent scenic value; especially important for maintaining species of rare birds and plants; control erosion and pest species.
Natural Resource Management Requirements: Maintain as an uninterrupted block in its natural state; pay special attention to potential impacts on rare plants and animals.
Priority Land Use Objectives: Public (or private) scientific natural area or reserve.
Means of Control: a) overlay zoning especially to exclude roads, buildings, and scenic blight; b) development of public park with special management, trails and access control points; c) public or private purchase of land (or easements).
Monitoring Requirements: a) surface runoff and erosion, especially gullyheads and groundcover; b) species diversity; c) forest continuity and buffer zones; d) populations of alien and rare plant species; e) deer overpopulations; and f) bird habitats.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 20 Big Ravine Oak Forest.

Map Key: 20 Resource District: 1 Critical Area: F

Quarter-Quarter Sections: SW/NE 7, SE/NW 7, NE/SW 7, NW/SE 7.

Total acres: 100

Biotypes: Oak forest.

Aspect: South, West, Northwest.

Slope: 20-60%

Important Functions and Values: Life support for a diversity of interdependent rare forest plant and animal species; outstanding natural viewsheds and vistas; gene bank for regeneration; soil and water conservation; scientific benchmark.
Present Condition: Natural.
Preferred Uses: Scientific area or reserve with buffering edges suitable as parks or trail corridors.
Acceptable Uses: Residential use provided necessary design steps, based on resource performance standards, are taken, for example, minimum density or selective ring clustering of residences above and below 10% slopes.
Means of Control: Acquisition with matching funds from the Wisconsin Stewardship Fund or the Dane County Natural Heritage Fund, or other special conservation grants.
Monitoring Requirements: Populations of indigenous and alien plant species at five-year intervals or more often, and soil stability.
Additional Notes and Sources of Information:
--Without protection, or via neglect, a loss of species and natural value is likely to occur throughout this area.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 44 Big Ravine Oak Savannas.

Map Key: 44 Resource District: 1 Critical Area: F

Quarter-Quarter Sections: SW/NW 1 (3 acres); SE/SW 1 (3 acres).

Total Acres: 6

Biotypes: Stunted, thin oak forest.

Aspect: South and West.

Slope: 30%

Important Functions and Values: a) life support (natural gradient from oak forest to prairie with special animal and plant habitats); b) soil and water conservation; c) scenic beauty; and d) historic.
Present Condition: Good, but intrusive brush invasion is presently underway and degrade area if allowed to continue. Preferred Uses: Part of a suggested Big Ravine Scientific Reserve.
Acceptable Uses: Park or low-density residential, set back on top of bluff with access restrictions.
Means of Control: a) Subdivision ordinances; b) public acquisition or easements; c) performance standards and guidelines together with special natural area management policies; and d) private land trusts.
Monitoring Requirements: a) pest species populations; b) erosion; c) species diversity; d) rare species populations; and e) key plant, bird, invertebrate, mammal populations.
Additional Notes and Sources of Information:

--This site is a very choice natural area with viewsheds and vistas which deserved high priority management and protection.

--It is highly probable that most of, the Town's threatened and endangered species exist here.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 78 Big Ravine Goat Prairies.

Map Key: 78(a), 78(b) Resource District: 1 Critical Area: F

Quarter-Quarter Sections: (a) NW/SW 7 (10 acres), (b) SE/SW 7 (10 acres).

Total acres: 20

Biotypes: Native lime prairie.

Aspect: South, Southwest.

Slope: 20-60%

Important Functions and Values: a) – these are the two best prairie relics in the Township and support a diversity of interdependent prairie species, raptors, and invertebrates; also, b) - there are outstanding natural and historic viewsheds and vistas; gene bank for regeneration; soil and water conservation; scientific benchmark.

Present Condition: Natural with some brush invasion - the highway 14 roadcut is a local defacement.

Preferred Uses: Scientific area or reserve with limited access, as part of the suggested Big Ravine Reserve.

Acceptable Uses: Residential use provided necessary design steps, based on resource performance standards, are taken, for example, low density or ring clustering of residences, set back above 10% slopes with erosion control policies.

Means of Control: a) acquisition with matching funds from the Wisconsin Stewardship-Fund or the Dane County Natural Heritage, or formation of a land trust; and b) a conservation management plan to control brush, pest species and human vandalism.

Monitoring Requirements: Populations of indigenous in contrast to alien plant species, at least at five-year intervals or as often as possible; also soil stability, erosion, pollution and vandalism.

Additional Notes and Sources of Information:

--Without access protection, or via neglect, plant species and birds of prey as well as scenic and historic landmarks may be lost to vandalism.

--The two prairies are owned respectively by Schulenberg (as of spring, 1990).

--See appendices for plant list.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: North Rim Black Earth Creek.

Map Key: G Resource District: 1

Quarter Sections: SE 7 (40 acres), NW & NE 8 (100 acres), NW & NE 9 (30 acres), SE 5 (10 acres), SE & SW 4 (80 acres), SW 3 (10 acres).

Sensitive Sites: 2, 32, 46, 78(c), 82.

General Description: Oak forests (mostly thin and stunted), oak savannas, goat prairie on south-facing bluffs.

Biotypes: Oak forest, lime prairie, oak savanna (some degraded as part of pasture or landfill).

Watershed Characteristics: Setting--A long corridor of mostly south-facing, dry, hot, rocky, steep slopes with ridges alternating with ravines. Input Area--approximately 550 _acres. Output--Black Earth Creek.

Slopes: 20-60%

Soils: Thin loans, erodible.

Land Uses: Steep ridges and ravines mostly in a natural state; some in cleared, eroding pasture; one closed landfill.

Most Important Natural Resources: A continuous savanna corridor; sites for prairie and oak savanna restoration (and maintenance); historic and scenic landmarks, vistas and viewsheds; soil and water conservation.

Natural Resource Management Requirements: a) removal of the brush, including all of the alien shrubs; b) control erosion; and c) a restoration program for oak regeneration and the reintroduction of missing savanna and prairie species.

Priority Land Use Objectives: Historic restoration, with compatible low-density, recreational developments.

Means of Control: a) overlay zoning with setbacks and screening of all structures; b) restriction of all development on steep slopes and in scenic areas; C) creation of public parks and trail corridors including the restoration of biotypes; d) public or private purchase of land (or easements); and e) design of organic, stormwater management facilities.

Monitoring Requirements: a) surface runoff and erosion, especially gullyheads and groundcover; b), bird and plant species diversity; c) forest continuity and buffer zones; d) pest species populations; e) oak density (maturity and regeneration); and f) vandalism.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 2 Evergreen Oak Forest.

Map Key: 2 Resource District: 1 Critical Area: G

Quarter-Quarter Sections: SE/SE 3 (10 acres), NE/SE 4 (20 acres), SE/SE 4 (30 acres).

Total acres: 60

Biotypes: Oak forest and savanna with some unique horticultural plantings.

Aspect: South, East, West, North.

Slope: 0-30%

Important Functions and Values: Neighborhood character and historic viewshed as a point over the glacial lake basin, with about 6.0 acres of oak forest and savanna; includes Evergreen Cemetery and large-lot residences with some pine plantings; on the east end of the north rim of the Black Earth Creek valley it has an important role as a groundwater recharge area (it is the true location of the surface water divide).

Present Condition: Partly natural forest; partly residential landscapes with lawns, trees, and shrubs.

Preferred Uses: Large-lot residential with increased natural landscaping to allow for oak regeneration; historic preservation of cemetery as an excellent view point.

Acceptable Uses: Very carefully controlled residential development, restricted to conform and improve the aspect to the adjacent parkland. ,

Means of Control: Ordinances to restrict further subdivision of large-lot arrangement; both conservation and scenic easements; and conservation management plans for erosion control, groundcover establishment, pest control and oak regeneration.

Monitoring Requirements: Populations of indigenous and alien plant species at least at five-year intervals or as: often as possible; soil stability, erosion, pollution and vandalism; oak regeneration.

Additional Notes and Sources of Information:

--This area is a focal point to the Black Earth Creek Valley on one side and the Lake Middleton Basin on the other.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 32 Gateway Savannas.

Map Key: 32 Resource District: 1 Critical Area: G

Quarter-Quarter Sections: SW & SE/SW 4 (20 acres), SW/SE 4 (10 acres), SW & NE/SE 7 (30 acres), NE & SE/NE 7 (30 acres), NE & SE/NE 7 (40 acres), SW & NE & SENW 8 (40 acres), NW & NE NE 9 (30 acres), NW & NW/NW 9 (30 acres).

Total acres: 230

Biotypes: A nearly continuous corridor of sparse or stunted oak savanna forests on steep, hot south slopes.

Aspect: South, Southeast, and Southwest.

Slope: 20-60%

Important Functions and Values: Oak savanna represents a historically important landscape - there is a potential for the restoration of this community type, at this location, without the use of fire; soil erosion and water conservation.

Present Condition: Mostly natural but densely invaded by brush, weed trees, and alien species in general.

Preferred Uses: Natural regeneration sites without any development for recreation, education, and the preservation of scenic vistas.

Acceptable Uses: Large-lot residential development with design based on resource performance standards, including setbacks for scenic enhancement and erosion control.

Means of Control: a) public or private purchase of land (or easements); 10 setbacks for scenic enhancement and erosion control; and c) conservation management plans for erosion control, groundcover establishment, pest control, and oak savanna regeneration.

Monitoring Requirements: Populations of indigenous and alien plant species at least at five-year intervals or as often as possible; soil stability, erosion, pollution, and vandalism; oak regeneration and density; and maintenance scenic screening and buffers.

Additional Notes and Sources of Information:

--A trail system should be developed along the entire corridor which would link connect to the Pheasant Branch Marsh through east to Lake Mandota and also link up the Ice Age Trail system.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 45 Highway 14 Savannas.

Map Key: 45 Resource District: 1 Critical Area: G

Quarter-Quarter Sections: NE/SE 7, SW/SE 7.

Total Acres: 30

Biotypes: Sparse or stunted oaks on steep, hot slopes.

Aspect: Southeast and Southwest.

Slope: 20-60%

Important Functions and Values: a) life support; b) soil conservation; c) scenic and historic landmarks.
Present Condition: Natural, but invaded by brush, trees, and other alien species.
Preferred Uses: Conservancy reserve; small park.
Acceptable Uses; Low-density residential outside forest block with strict buffer zone.
Means of Control: a) Subdivision ordinances with setbacks for screening and erosion control; b) conservation and scenic easements; and c) public land acquisition or easements.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak densities and population (mature and sapling); d) groundcover populations; e) scenic assessments.
Additional Notes and Sources of Information:
--This site is a portion of the north rim corridor west of the landfill; it is contiguous with Critical Area "F" and Sensitive Site 32.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 46 Landfill Savanna.

Map Key: 46 Resource District: 1 Critical Area: G

Quarter-Quarter Sections: SW/NW 8 (10 acres).

Total acres: 10

Biotypes: Oak savanna fringe above landfill (Debeck's).

Aspect: South.

Slope: 30-60%

Important Functions and Values: Important viewpoint and location for screening; scenic restoration of plants would also help reduce runoff.
Present Condition: Natural, but with erosion.
Preferred Uses: Natural buffer area.
Acceptable Uses: Carefully developed park and trail system. Means of Control: Private easements.
Monitoring Requirements: Populations of indigenous and alien plant species at least at five-year intervals or as, often as possible; soil stability, erosion, pollution, and oak regeneration.
Additional Notes and Sources of Information:

--This section of savanna is singled-out because of the need to link the trail corridor, both to the east and west above the landfill.

--Special regulations and ownership agreements can be used to control this area.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 78(c) North Rim Goat Prairie Restoration Sites.

Map Key: 78(c) Resource District: 1 Critical Area: G

Quarter-Quarter Sections: SW & SE/NE 8, NW/NW 9.

Total acres: About 20.

Biotypes: Dry, hot openings in the oak savanna and pastured grasslands.

Aspect: South.

Slope: 20-60%

Important Functions and Values: Gene bank for prairie species; historic landscape; water quality insurance, soil erosion control and regeneration; and potential for biotype restoration.

Present Condition: Open section of pasture grasses and invading brush among scattered trees on steep, eroding sites. Preferred Uses: Restored biotypes (prairie and savanna).

Acceptable Uses: Carefully siting of residential dwellings set back, above and below steep slopes, with the necessary restrictions based on resource performance standards; nature reserves.

Means of Control: a) public or private purchase of land (ox easement); b) review of development permits according to specific environmental standards; and c) conservation management plans including provisions for scenic enhancement, erosion control, and prairie restoration.

Monitoring Requirements: Populations of indigenous and alien plant species at least at five-year. intervals or as often as possible; soil stability, erosion, pollution, and oak regeneration.

Additional Notes and Sources of Information:

--Prairies at the west end of the corridor are included in Critical Area F as Sensitive Sites 78(a) and 78(b).

--See appendices for list of expected plant and animal species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 82 Landfill Prairie Restoration Site.

Map Key: 82 Resource District: 1 Critical Area: G

Quarter-Quarter Sections: SE/NW 8, NW/SW 8.

Total acres: 30

Biotypes: Man-made cut and fill over waste; potential for restored grassland.

Aspect: South.

Slope: 10-20%

Important Functions and Values: Site has potential scenic enhancement and erosion control. Restoration might also offer habitat for wildlife and indigenous plant species.

Present Condition: A raw, unnatural surface with highly erodible slopes.

Preferred Uses: Passive recreational and educational – a grassland would present a more diverse and enjoyable alternative once the, wasteland environment is made safe for people. The site could also provide a link to the Ice Age

Acceptable Uses: Restricted natural grassland and restored savanna.

Means of Control: State regulations for post-landfill use and mandatory site restoration; dedication as parkland.

Monitoring Requirements: Populations of indigenous and alien plant species; soil stability, erosion, and percolation sampling; health and safety factors.

Additional Notes and Sources of Information:

--prairie grassland is ideal for providing a stable cover in this type of situation and has been used at other landfill sites, including Badger landfill outside Verona.

--Restoration might also attach opportunities scientific research.

--See appendices for list of expected plant and animal species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: North Rim Rocky Dell.

Map Key: D Resource District: 1

Quarter Sections: SW, SE 6, & NW 8.

Sensitive Sites: 43, 68, 77; with 43 & 68, forest & 77, grassland.

General Description: Oak savannas, goat prairie; savanna-oak regeneration sites and buffer strips in areas on south-facing slopes.

Biotypes: Oak forest, lime prairie, oak savanna.

Watershed Characteristics: Setting--A long corridor of mostly south-facing, dry, hot, rocky slopes. Input Area--220 acres. Output--Rocky Dell to Black Earth Creek.

Slopes: 15-60%

Soils: Kidder and Sogn loams, highly erodible; thin, exposed rocky soils (with dolomite).

Land Uses: Steep ridges and ravines mostly in a natural state; some light logging in the past, possibly early pasturing use as well; one small quarry.

Most Important Natural Resources: A corridor of relic prairies, oak savannas, young deciduous forests with mixed forest in the ravines; historic and scenic viewsheds and vistas; soil and water conservation; gene bank for endangered plant species.

Natural Resource Management Requirements: a) no development on slopes; b) control of alien species and native brush; and a restoration program for oak regeneration and the reintroduction of missing savanna and prairie species.

Priority Land Use Objectives: a) scientific reserves; b) passive recreational and educational uses; c) restricted residential development, based on resource performance standards, setbacks for scenic screening and erosion control.

Means of Control: a) Overlay zoning with review of' permits according to specific environmental' standards including required setbacks for steep slopes and enhancement of scenic areas; b) development of public parks and trail corridors with limited access; and c) private land trusts and easements on large lots.

Monitoring Requirements: a) surface runoff and erosion, especially at gullyheads; b) pollution including dumping; c) extent and durability of groundcover; d) bird and plant species diversity; e) pest species populations; and d) oak density (maturity and regeneration).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 43 Rocky Dell Oak Forest And Savannas.

Map Key: 43 Resource District: 1 Critical Area: D

Quarter-Quarter Sections: NW & NE/SE 8 (15 acres), SW & SE/SW 6 (50 acres), NE & NW/NW 7 (40 acres), & SW/NW 7 (5 acres).

Total acres: 110

Biotypes: Oak forest and savanna species association.

Aspect: South, Southwest, and Southeast.

Slope: 15-60%

Important Functions and Values: Gene bank for plant species, endangered plant and invertebrate species; pre settlement historic landscape; scenic viewsheds and vistas; water quality insurance and erosion control.
Present Condition: Good; some trees young, dwarfed or scattered; a few alien herbs and shrubs; some excessive brush invasion.
Preferred Uses: Nature or scientific reserves.
Acceptable Uses: Local public park and trail system with controlled access; private residential large-lot development with permits based on resource Performance standards; scenic enhancement; preservation of landmarks and integrative, natural landscaping.
Means of Control: Subdivision ordinances with, review according to specific environmental standards; public or private purchase of land (or easements); and conservation management for oak regeneration. -
Monitoring Requirements: Populations of indigenous and alien plant species, soil stability, erosion, pollution, and oak regeneration.
Additional Notes and Sources of. Information:

--The Coyle property, enhanced by the late owner, H. M. Clark, via plantings and record-keeping, presents a unique opportunity for a special conservation reserve design with a) savanna restoration on top of the bluff, b) a viewpoint at the edge, and c) a prairie reserve below the small quarry site

--See appendices for list of expected plant and animal species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 68 Rocky Dell Oak Savanna And Oak Forest Regeneration Sites.

Map Key: 68 Resource District: 1 Critical Area: D

Quarter-Quarter Sections: NW & NE/SE 8, SW & SE/SW 6, NE & NW/NW 7, & SW/NW 7.

Total acres: 50

Biotypes: Oak forest openings.

Aspect: South, Southwest, and Southeast.

Slope: 15-60%

Important Functions and Values: Offers locations where a pre-settlement historic landscape with scenic viewsheds and vistas can be reestablished.
Present Condition: Good; some trees young, dwarfed or scattered; a few alien herbs and shrubs.
Preferred Uses: Natural or scientific reserves.

Acceptable Uses: Local public park and trail system with controlled access; private residential large-lot development with natural landscaping, based on resource performance standards.
Means of Control: Subdivision ordinances with review according to specific environmental standards; public or private purchase of land (or easements); management for oak regeneration including selective thinning to favor scattered oaks interspersed among restored prairie grasses.
Monitoring Requirements: Populations of indigenous and alien plant species, soil stability, erosion, pollution, and oak regeneration.
Additional Notes and Sources of Information:
--Openings in the oak forest as described in Sensitive Site 43.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 77 Rocky Dell Goat Prairies.

Map Key: 77 Resource District: 1 Critical Area: D

Quarter-Quarter Sections: Prairie (a) SE/SW 6 (2 acres);
Prairie (b) NE/NW 7 (1 acre); Prairie(c) NW/NW 7 (2 acres) plus additional scattered smaller sites amounting to 5 acres.

Total acres: 10

Biotypes: Dry lime prairie.

Aspect: Southwest.

Slope: 20-60%

Important Functions and Values: Relic prairie sites serve as habitat and gene banks for species of flora and invertebrates, some of which are endangered; historic landscape with scenic vistas.
Present Condition: Prairie 77(a) is in good condition, prairie 77(b)'s condition is unknown, and prairie 77(c) has been used for pasture. All the prairies have some invasion by aspen, oak, alien buckthorn, and leafy spurge.
Preferred Uses: Natural or scientific reserves.
Acceptable Uses: Local public park and trail system with controlled access.
Means of Control: Public or private purchase of land (ox easements); conservation management to favor maintenance of prairie and savanna species.
Monitoring Requirements: Populations of indigenous and alien plant species, and endangered plant species; vandalism.
Additional Notes and Sources of Information:
--See appendices for goat prairie species list.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: South Rim Rocky Dell Forest And Buffers.

Map Key: E Resource District: 1

Quarter Sections: SW/SE 6 (30 acres), NE/NW 7 & NW/NW 7 (40 acres), SE/NW & SW/NW 7 (10 acres).

Sensitive Sites: 72

General Description: Mixed deciduous forest with buffer areas above slopes.

Biotypes: Oak and walnut forest.

Watershed Characteristics: Setting--A corridor of north, northwest-facing, cool, steep, rocky slopes. Input Area--160 acres. Output--Rocky Dell to Black Earth Creek.

Slopes: 20-60%

Soils: Kidder and McHenry loams, highly erodible.
Land Uses: Mostly in a natural state.
Most Important Natural Resources: Unique walnut and oak forest forms an unbroken, highly diverse and scenic corridor, especially supportive of wildlife.
Natural Resource Management Requirements: a) no development on slopes; b) control of erosion at the gullyheads; and c) a conservation plan to prevent the loss of tree cover.
Priority Land Use Objectives: a) scientific or natural reserves; b) passive recreational uses with controlled access; and c) restricted residential development, based on resource performance standards, with compulsory setbacks for scenic enhancement and erosion control.
Means of Control: a) Overlay zoning with review of permits according to specific environmental standards including screening and setbacks form steep slopes; b) development of public parks and trail corridors with limited access; c) land trusts and private easements on large lots; and d) parcel specific conservation plans.
Monitoring Requirements: a) Surface runoff and erosion, especially at gullyheads; b) bird and plant species diversity; c) pest species populations; d) tree and groundcover diversity and stability; e) continuity of the forest interior and edge; and f) buffer zones above slopes and at margins.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 72 South Rim Rocky Dell Walnut Forest.

Map Key: 72 Resource District: 1 Critical Area: E

Quarter-Quarter Sections: SW/SE 6 (30 acres), NE/NW 7 & NW/NW 7 (40 acres), SE/NW & SW/NW 7 (10 acres).

Total acres: 80

Biotypes: Walnut-oak forest.

Aspect: North.

Slope: 20-60%

Important Functions and Values: Unique walnut invasion of oak forest creating a special wildlife habitat type with high scenic appeal.
Present Condition: Mostly good; no development at present, no interruption of forest canopy; excellent scenic backdrop from vistas on the north rim.
Preferred Uses: Natural or scientific reserves.
Acceptable Uses: Residential with permits based on resource performance standards that include adequate setbacks and management guidelines to control erosion and prevent interruption of the existing tree canopy.
Means of Control: Public or private acquisition; subdivision ordinances or zoning with review according to specific environmental standards that require large lots with adequate setbacks; a stormwater ordinances and conservation management plan to favor enhancement of walnut forest species.
Monitoring Requirements: Erosion, pollution floral and faunal diversity, and forest continuity.
Additional Notes and Sources of Information:
---See appendices for forest species list.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALIONS

Area Name: Deer Run Island.

Map Key: I Resource District: 1

Quarter Sections: SW 7 & NW 18.

Sensitive Sites: 70

Area Description: This "island" is a dolomite bluff outlier of 160 acres surrounded by the Black Earth Creek valley floor waterways; is partly in Cross Plains Township.

Biotypes: Mixed forest.

Watershed Characteristics: Setting--Middle of upper Black Earth Creek valley. Input Area--160 acres. Output—Black Earth Creek.

Slopes: 5-15%

Soils: Dodge, Kidder, Whalen, McHenry, St. Charles erodible; Seaton, sandy loam, erodible.
Land Uses: Large-lot residential with parcel specific forest conservation plans.
Most Important Natural Resources: Mixed forest with good tree diversity and varied age classes.
Natural Resource Management Requirements: Integrative native landscaping with forest management specifications allowing for tree regeneration, controlling erosion and pest species, maintaining litter, and insuring water quality in associated ponds. -
Priority Land Use Objectives: Maintain large-lot residential with adequate screening and setbacks, improve internal drainage, and prevent roads and driveways on steep slopes.
Means of Control: Overlay zoning based on resource performance standards; implementation and enforcement of erosion and water quality management requirements, including a special construction ordinance; the installation of buffer zones at gullyheads and to protect the wetlands below.
Monitoring Requirements: a) tree populations (mature and sapling) and forest continuity; b) natural groundcover; c) erosion and pollution; and d) pest species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 70 Deer Run Island.

Map Key: 70 Resource District: 1 Critical Area:

Quarter-Quarter Sections: SW/SW 7 (30 acres), NW/NW 18 (40 acres) & SW/NW 18 (30 acres).
Total Acres: 100

Biotypes: Mixed forest.

Aspect: Various.

Slope: 20-60%

Important Functions and Values: a) wildlife support for forest and wetland edge species; b) soil and water conservation; c) biodiversity.

Present Condition: Fair to good as many landowners have left natural groundcover intact, especially on slopes, and moderate forest thinning has allowed for a diverse tree regeneration.

Preferred Uses: Maintain present low-density residential, according to performance standards, with no building or roads on steep slopes.

Acceptable Uses: Higher-density residential, but with strict design guidelines for tree cover, erosion control and water quality management and absolutely no development on steep slopes.

Means of Control: a) Public or private purchase of land (or easements) on slopes; b) land trusts, covenants or other legal mechanisms to, restrict further subdivision of large-lot residential parcels; c) professional advice and public education to introduce conservation plans that use native groundcover and tree regeneration.

Monitoring Requirements: a) erosion and pollution; b) forest continuity; c) pest species populations; and d) tree regeneration.

Additional Notes and Sources of Information:

--Good landscape design recognizes the need for natural groundcover to improve habitat, and allow for wildlife observation and appreciation by residents.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: Quarry Island.

Map Key: J Resource District: 1

Quarter Sections: SW & SE 8 & NW & NE 17.

Sensitive Sites: 33, 64, 71.

General Description: A dolomite bluff of 80 acres with a quarried west face.

Biotypes: Mixed forest with oak and oak savanna regeneration.

Watershed Characteristics: Setting--Middle of upper Black Earth Creek valley. Input Area-100 acres. Output--Black Earth Creek.

Slopes: 10-60%

Soils: Kidder, Whalen, Sugar, New Glarus,-McHenry silt foams, erodible; and stony outcrops.
Land Uses: Agricultural, quarry, fallow, and utility substation.
Most Important Natural Resources: Life support for a wide diversity of plant and animal species, and biotypes (prairie, oak savanna, mixed forest, wet forest); important vista; geologic feature-
Natural Resource Management Requirements: Maintain part of the area as a continuous, natural land segment consisting of the various plant communities.
Priority Land Use Objectives: Public park; recreational and educational site.
Means of Control: Overlay zoning on steep slopes with any restricted development based on resource performance standards; implementation and enforcement of erosion and water quality management requirements, including buffer zones especially at gullyheads.
Monitoring Requirements: a) oak populations (mature and sapling); b) continuity of various biotypes; c) erosion and pollution; d) pest species and savanna encroachments; and e) amphibian and bird abundance and diversity.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 33 Island Savanna.

Map Key: 33 Resource District: 1 Critical Area: J

Quarter-Quarter Sections: SW/SW 8 (10 acres), SE/SW 8 (5 acres), NW/NW 17 (5 acres) & NE/NW 17 (10 acres).

Total Acres: 20

Biotypes: Prairie, oak forest, and oak savanna.

Aspect: South.

Slope: 40-60%

Important Functions and Values: a) life support for plant and animal species; b) biodiversity; c) soil and water, conservation; and d) scenic beauty.

Present Condition: Quarry has destroyed half of the area but parts remain in natural condition; suitable for maintenance and regeneration; excellent vista.

Preferred Uses: Conservancy on steeper slopes and perhaps a park with the quarry site acting as a unique micro-climatic element of the plan.

Acceptable Uses: Large-lot residential on top (assuming no further quarrying) with design guidelines for erosion control, water quality management, and setbacks based on resource performance standards.

Means of Control: a) subdivision plat specifications, according to specific environmental standards, including setbacks form slopes, and waterways, vistas, and forest edges; and b) public or private purchase of land (or easement).

Monitoring Requirements: a) oak regeneration (mature and sapling); b) erosion and pollution; c) species abundance and diversity; d) pest species populations; e) continuity of biotype gradients; f) scenic viewpoints; and f) vandalism.

Additional Notes and Sources of Information:

--Owner expectations are unknown, but there appears to be an opportunity to, develop a nature park with an over-look vista and points for interpretation of special geological and biotic features.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONNS

Site Name: 64 Quarry Island Oak Savanna Restoration Site.

Map Key: 64 Resource District: 1 Critical Area: J

Quarter-Quarter Sections: SW/SE 8 (20 acres) & NW/NE 17 (20 acres).

Total Acres: 40

Biotypes: Old fields and brush.

Aspect: South and East.

Slope: 20-60%

Important Functions and Values: a) soil and water conservation; and b) oak regeneration either as forest or savanna. Present Condition: Agricultural use.

Preferred Uses: Public park, with the steeper slopes managed for oak regeneration.

Acceptable Uses: Low-density residential, low-impact agricultural or private recreation business, all with design guidelines for erosion control, water quality management, and aesthetic improvement based on resource performance standards.

Means of Control: a) subdivision plat specifications, with review of permits according to specific environmental standards, including setbacks for slopes, and conditions for waterways, vistas, and forest edges; and b) public acquisition of park space.

Monitoring Requirements: a) oak regeneration, populations (matur7 and sapling); b) erosion, pollution, and flooding; c) species abundance and diversity; d) pest species populations.

Additional Notes and Sources of Information:

--Further, more detailed inventories are needed to provide specific development recommendations in this and similar areas.

--See appendices for list of expected plant and animal species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 71 Quarry Island Mixed Forest.

Map Key: 71 Resource District: 1 Critical Area: J

Quarter-Quarter Sections: NE/SW 8 (10 acres), SE/SW 8 (10 acres) & NE/NW 17 (20 acres).

Total Acres: 40

Biotypes: Mixed forest grading into wet forest floodplain.

Aspect: South and North.

Slope: 20-60%

Important Functions and Values: a) life support and wildlife reserve for forest and wetland edge species; b) soil and water; conservation; and c) biodiversity.
Present Condition: Mostly natural.
Preferred Uses: Conservancy for slopes connecting with wetlands below.
Acceptable Uses: Low-density residential with design guidelines for erosion control and storm and groundwater management on the upper, more gradual slopes, based on resource performance standards; public park.
Means of Control: a) subdivision plat specifications, with review of permits according to specific environmental standards, including setbacks form slopes, and conditions for waterways, vistas, and forest edges; b) public or private purchase of land (or easements); and c) conservation land trusts.
Monitoring Requirements: a) erosion and pollution; b) species abundance and diversity; c) pest species populations, and d) continuity of biotype gradients.
Additional Notes and Sources of Information:
--This area requires further examination in order to provide specific design and management recommendations.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON NATURAL RESOURCE DISTRICT EVALUATIONS

District Name: Glacial Lake Middleton Basin.

Map Key: 2

Sections: 2, 3, 4, & 10.

District Characteristics: Open, level terrain.
Topography: Flat.
Geology: Bed of extinct glacial lake.
Vegetation: Agricultural (non-sustainable, however, since muck soils deteriorate when drained and farmed).
Soils: Silt, sand, and peat.
Hydrology: Ditched former two-square mile stormwater retention basin for six-square mile watershed of North Fork of Pheasant Branch Creek.
Natural History: Former bog meadow now suitable for restoration.
Scenic Beauty: Open greenspace.
Historic Importance: Unique geological (glacial) landscape feature.
Most Important Natural Resources: Restoration potential for extirpated wildlife and for two large ecosystems downstream--the Pheasant Branch Wetland and Lake Mendota.
Priority Land Use Objectives: Wetland Conservancy for stormwater management, wildlife restoration open space preservation, Ice Age Trail recreation link.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: Glacial Lake Middleton.

Map Key: A Resource District: 2

Quarter Sections: NE 4 (80 acres), NW 3 (80 acres), & SW 3 (100 acres); SE 3, NE 10 & NW 10 in the City of Middleton.

Sensitive Sites: 84

General Description: A relatively flat floodplain area; stormwater basin with a few wetland pockets of 1-2 acres in a basin of over 200 acres.

Biotypes: Sedge meadow.

Watershed Characteristics: Setting--Wide, flat open land, east of the Black Earth Creek; Input Area--2,000 acres from the North and South branches of Pheasant Branch Creek; Output--Pheasant Branch Creek east to Lake Mendota.

Slopes: flat, from 0-0.2%.

Soils: Wacousta silt foams, erodible; Granby, loamy sand, erodible; and smaller sections of Adrian and Houghton mucks.
Present Condition: Drained by ditching.
Land Uses: Sod farms, tree nursery, some light industrial (City of Middleton), agricultural.
Most Important Natural Resources: An open expanse of wetland which can provide flood storage, water quality, life-support, recreation and scenic beauty functions. As a stormwater management area, this wetland can store and help clean 200-600 acre-feet of floodwater by prolonged detention without need for special structures; as a restored sedge meadow, it provides habitat for threatened birds as well as grassland song birds; as a geological and historical natural feature, it can satisfy educational and recreational needs.
Natural Resource Management Requirements: Restrict some drainage, selectively restore to native wetland species, and manage as a sedge meadow with some deep-water marshes.
Priority Land Use Objectives: Wetland preservation and stormwater management; wildlife habitat; multi-use recreation; scenic open space separating urban and rural landscapes.
Means of Control: Public acquisition, and cooperative management by the State, the Town of Middleton, and the City of Middleton with assistance from agencies and organizations such as the Dane County Natural Heritage Foundation, The Nature Conservancy, the Ice Age Trail, and the DNR Stewardship Fund.
Monitoring Requirements: a) water table; b) flood levels; c) erosion and pollution; d) stormwater detention periods; and e) vegetation and wildlife populations.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 84 Lake Middleton Peatlands.

Map Key: 84 Resource District: 2 Critical Area: A

Quarter-Quarter Sections: NW/NW 3 (40 acres), SW/NW 3 (40 acres), NW/SW 3 (30 acres), SW/SW 3 (15 acres), NE/SW 3 (40 acres), & SE, NE, SW, & NW `3 (160 acres); an additional 200 acres in the City of Middleton.

Total Acres: Approximately 200 (in the Town).

Biotypes: Prairie pothole wetlands; low farmland with marsh pockets in drainage ditches.

Slope: flat, from 0-0.2%.

Important Functions and Values: With restoration, the entire area or integral parts of it, can function as; a) life=support for wet prairie and sedge meadow, fauna and flora; b) water retention and water quality control for Pheasant Branch Creek and Lake Mandota; c) a recreation and wildlife corridor; d) a sustainable agricultural base in harmony with wetland resource requirements; and e) scenic greenspace.

Present Condition: Drained cropland, sod farm, and nursery; drainage causing erosion and downstream pollution problems.

Preferred Uses: a) restored floodable cropland; b) wetland conservancy as wet prairie or meadow wildlife habitat; and c) public trails and non-deprecating recreation.

Acceptable Uses: Any-that retain the natural flood storage and open space functions, and the indigenous glacial lake landform of the floodplain; examples include specialized agriculture, certain low-maintenance recreation facilities, and airport space.

Means of Control: a) floodplain and wetland zoning; b) conservation easements; c) public purchase for parkland; d) public or private purchase for preservation of wetlands and restoration of wetland functions.

Monitoring Requirements: a) hydroperiods; b) populations of indigenous flora and fauna; c) erosion and pollution sources; d) fill and other encroachments.

Additional Notes and Sources of Information:

--Special cooperation between the City of Middleton, the Town of Middleton, and the County is required to insure that this vital lowland area is designed and managed in a way that best preserves its ecological functions. Ice Age Trail and State Stewardship assistance should also be considered.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETONNATURAL RESOURCE DISTRICT EVALUATIONS

District Name: North Fork Pheasant Branch Countryside.

Map Key: 3

Sections: 4, 5, & 6.

General Characteristics: Rural agricultural (with a few settlements and woodlots).

Topography: Rolling, slopes to southeast, 950-1150 feet.
Geology: Ground moraine over dolomite.
Vegetation: Associated with dairy farms, ditched waterways and drying ponds, and several oak woodlots.
Soils: Silt loans.
Hydrology: Part of six-square mile watershed of the North. Fork of Pheasant Branch Creek; Probably, has an important role in groundwater discharge.
Natural History: Formerly oak-hickory forests with some oak savannas; ponds and natural creek waterways.
Scenic Beauty: Rural landscape.
Historic Importance: Glacial landscape feature and with landmark evidence of early settlement.
Most Important Natural Resources: Restoration potential for woodlands and wetlands; headwaters of important Lake Mendota tributary, the North. Fork of Pheasant Branch Creek; groundwater recharge; special use agricultural soils.
Priority Land Use Objectives: Floodplain wetland restoration; riparian conservancy and stormwater management facility; agricultural preservation balanced with residential development.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: North Line.

Map Key: B Resource District: 3

Quarter Sections: NW 4 & NE 5.

Sensitive Sites: 1, 91(a), 91(b).

General Description: An "island" of quality oak forest with adjacent, small wetland areas; area continues into adjacent Springfield Township.

Biotypes: Oak forest, and small temporary ponds and waterways.

Watershed Characteristics: Setting--Ridge west of North Fork of Pheasant Branch Creek. Input Area--400 acres (waterway leading to North Fork). Output--North Fork Pheasant Branch Creek.

Aspect: Northwest, North, and Northeast in Sensitive Site 1, flat in Sites 91(a) and 91(b).

Slopes: 12%

Soils: Forest slopes--McHenry, steep, erodible; Wetland areas-- Batavia and Grays silt loams, over sand or gravel.
Land Uses: Forest--natural; Wetlands--ditching and fallow. No development or roads at present.
Most Important Natural Resources: A quality natural unit for plant and animal' diversity which may in part serve as a benchmark for regeneration efforts elsewhere; ponds and waterways are important habitat for amphibians and invertebrates and may be important to groundwater recharge.
Natural Resource Management Requirements: Maintain forest quality and diversity of species; restore wetland and waterway habitat.
Priority Land Use Objectives: Preservation and management to maintain total area as a contiguous natural unit.
Means of Control: Overlay zoning or special natural area protection to limit development.
Monitoring Requirements: a) species abundance and diversity; b) natural groundcover; c) wetland hydroperiod; d) pest species populations; and e) biotype continuity.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 1 North Line Forest.

Map Key: 1 Resource District: 3 Critical Area: B

Quarter-Quarter Sections: NW/NW 4 & NE/NE 5.

Total Acres: 45

Biotypes: Oak forest.

Aspect: Northwest, North, and Northeast.

Slope: 12%

Important Functions and Values: a) life support and wildlife, reserve for forest species; b) soil and water conservation; and c) biodiversity.
Present Condition: Healthy woodland.
Preferred Uses: Forest and wildlife preserve with buffers around edges to protect from degrading impacts and to provide insulation from adjacent-intensive use.
Acceptable Uses: Low-density residential at the margins only, with design guidelines for buffers, setbacks, erosion control, and water quality management (especially at gullyheads) based on resource performance standards.
Means of Control: a) public or private purchase of land (or easements); b) subdivision ordinances with review of permits according to specific environmental standards; c) protection under State natural or scientific area status; and d) special protection as a local conservancy district.
Monitoring Requirements: a) populations of, deer and bards; b) forest continuity; c) pest species populations; d) oak population (mature and sapling); and e) erosion and pollution.
Additional Notes and Sources of Information:
--We suggest that this area be, evaluated for State natural or scientific area status and that public acquisition (or easement through Dane County Natural Heritage Foundation) is made, including a buffer strip fox oak, regeneration along adjacent fencerows and as a corridor to the wetland areas.
--See appendices for plant list.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 91(a) North Line Ponds Restoration Site.

Map Key: 91(a) Resource District: 3 Critical Area: B

Quarter-Quarter Sections: NE/NW 4.

Total Acres: 15

Biotypes: Temporary ponds (or sinks) and waterway.

Aspect: Southeast.

Slope: 1%

Important Functions and Values: With-restoration - a) Life support and wildlife reserve for forest species; .b, :) ground water and surface water conservation; and c) increased biodiversity.
Present Condition: Ditched and drained wetland.
Preferred Uses: Restored wetland and waterway would serve as a forest buffer and corridor.
Acceptable Uses: Agricultural or low-density residential with design guidelines for erosion control and water quality management, based on resource performance standards that include setbacks for wetland restoration zones.
Means of Control: a) include as part of floodplain zoning ordinance and greenways stormwater management plan; and b) public or private purchase of land (or easements).
Monitoring Requirements: a) erosion and pollution; b) wetland hydroperiod; and c) plant and animal abundance and diversity.
Additional Notes and Sources of Information:
--All natural drainage systems should be delineated and included in an open greenways, stormwater management plan.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 91(b) North Fork Pheasant Branch Creek Wet Forest Restoration Site.

Map Key: 91(b) Resource District: 3 Critical Area: B

Quarter-Quarter Sections: SE/NE 5 (east of Capital. View Road).

Total Acres: 5

Biotypes: Floodplain forest along waterway.

Aspect: East.

Slope: 1%

Important Functions and Values: a), life support and wildlife reserve for forest species; b) soil and water conservation.

Present Condition: Situation has encouraged invasion by willows--other successional species will follow or can be planted.

Preferred Uses: Restored waterway--would serve as a buffer and open greenway reserve.

Acceptable Uses: Agricultural or low-density residential with design guidelines for erosion control and water quality management, based on resource performance standards, including setbacks for wetland restoration zones.

Means of Control: a) include as part of floodplain zoning ordinance; b) designate as open greenway and local conservancy; c) review all permits according to specific environmental standards; and d) install-water-control device.

Monitoring Requirements: a) erosion and pollution; b) hydroperiod; c) plant and animal abundance and diversity; and d) pest species populations.

Additional Notes and Sources of Information:

--This is an appropriate place to illustrate proper vegetation management in an open greenway that functions as a, stormwater management device.

--Waterlevel fluctuation, partially modulated by a water detention control device, would still require floodplain forest as the only wetland vegetation able to tolerate such an unstable environment.

--See appendices for list of expected plant and animal species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: Northwest Block.

Map Key: C Resource District: 3, 1

Quarter Sections: NW 5, SW, & NE & NW 6.

Sensitive Sites: 3, 17, 19, 47, 65, 66, 67.

General Description: Sloping oak forest and regeneration sites.

Biotypes: Oak forest with adjacent fields and lawns.

Watershed Characteristics: Setting--Wooded slopes in developing residential plats. Input Area--360 acres. Output at West --Enchanted Valley tributary to the Black: Earth Creek (Sites 19 & 67). Output at East--North Fork of Pheasant-Branch Creek (Site 18).

Aspect: South, Northeast and West.

Slopes: 10-20%

Soils: Dodge and Kidder silt foams, erodible.
Land Uses: Residential development.
Most Important Natural Resources: Forest features and amenities for residents; erosion control on slopes; and wildlife, if an ecologically sound forest management policy is followed.
Natural Resource Management Requirements: Reserve and management of oak and prairie regeneration sites;' control of erosion and pest species; and integrative native landscaping and maintenance.
Priority Land Use Objectives: Maintain existing wooded blocks and apply integrative natural landscaping techniques within developed lots; incorporate a common nature park.
Means of Control: Overlay zoning on slopes with setbacks; local conservancy designations; review of permits according to specific environmental standards; public or private purchase of common forest plats (use of easements or formation of land trusts); implementation and enforcement of erosion and water quality management requirements; education and professional advice on conservation plans.
Monitoring Requirements: a) oak population (mature and sapling); b) continuity of forest; c) erosion and pollution; d) pest species populations; and e) percentage of land in natural forest and groundcover.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS Site

Name: 17 Dellwood Hill Oak Forest.

Map Key: 17 Resource District: 3 Critical Area: C

Quarter-Quarter Sections: NE/NE 6.

Total Acres: 20

Biotypes: Oak forest.

Aspect: East and Northeast.

Slope: 10-20%

Important Functions and Values: a) wildlife support; b) soil and water conservation; and c) aesthetic and domestic tranquility.

Present Condition: Partially developed.

Preferred Uses: Large-lot residential with integrative native landscaping requirements based on resource performance standards; selective clustering at higher densities according to specific environmental standards that insure oak forest sustainability.

Acceptable Uses: Increased residential densities still based on rigorous performance standards that protect the forest element.

Means of Control: a) subdivision ordinances with review of Permits according to resource performance standards that include appropriate lot size and setbacks; b) Public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans, that include integrative native landscaping.

Monitoring Requirements: a) pest species populations; b) erosion and Pollution; c) Oak Population (mature and sapling); and, a) animal, species abundance and diversity (especially birds).

Additional Notes and Sources of Information:

--All residential development in wooded areas should be carefully designed and managed to insure forest quality and sustainability.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 18 Bruner Road Forest.

Map Key: 18 Resource District: 3 Critical Area: C

Quarter-Quarter Sections: SW/NW 5.

Total Acres: 20

Biotypes: Oak forest.

Aspect: South.

Slope: 10-20%

Important Functions and Values: a) wildlife support; b) soil and water conservation; and c) aesthetic and domestic tranquility.

Present Condition: Partially developed with large lot sizes.

Preferred Uses: Large-lot residential with integrative native landscaping requirements based on resource performance standards; selective clustering at higher densities according to specific environmental standards that insure oak forest sustainability.

Acceptable Uses: Increased residential densities still based on rigorous performance standards that protect the forest element.

Means of Control: a) subdivision ordinances with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land (or easements); and c) education and Professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.

Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak population (mature and sapling); and d) animal species abundance and diversity (especially birds).

Additional Notes and Sources of Information:

--All residential development in wooded areas should be carefully designed and managed to insure forest quality and sustainability.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 19 Enchanted Valley Forests.

Map Key: 19 Resource District: 3 Critical Area: C

Quarter-Quarter Sections: NE & SE/NW 6.

Total Acres: 80

Biotypes: Oak forest.

Aspect: West, Southwest and Northwest.

Slope: 10-20%

Important Functions and Values: a) wildlife support and reserve for forest species; b) soil and water conservation; and c), aesthetics and domestic tranquility.

Present Condition: Partially developed with small to large lot sizes.

Preferred Uses: Large-lot residential with integrative native landscaping requirements based on resource performance standards; selective clustering at higher densities according to specific environmental standards that insure oak forest sustainability; erosion and stormwater remediation on all future subdivision plats; and restrictions on roads and buildings on slopes.

Acceptable Uses: Increased residential densities still based on rigorous performance standards that protect the forest element and insure erosion control.

Means of Control: a) subdivision ordinances with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) public or common Private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.

Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak population (mature and sapling); and d) animal species abundance and diversity (especially birds).

Additional Notes and Sources of Information:

--All residential development in wooded areas should be carefully designed and managed to insure forest quality and sustainability.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 67 Enchanted Valley Oak Savanna Regeneration Sites.

Map Key: 67 Resource District: 3 Critical Area: C

Quarter-Quarter Sections: NE, NW, & SW/NW 6, & NW & NE/SW 6.

Total Acres: 120

Biotypes: Pastures, fields, unbuilt residential lots, and oak forest edges.

Aspect: Mostly West.

Slope: 10-20%

Important Functions and Values: a) wildlife support and reserve for forest species; b) soil and water conservation; c) aesthetics and domestic tranquility; and oak regeneration.
Present Condition: Partially developed with open fields and lawns; some gullies.
Preferred Uses: Restrict development and reserve vacant lots, steep slopes, drainageways, and buffer strips on built and unbuilt lots for open greenspace.
Acceptable Uses: Residential with setback requirements on all future buildings on steep slopes based on resource performance standards.
Means of Control: a) subdivision ordinances with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak population (mature and sapling); and d) animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:
--All residential development in wooded areas should be carefully designed and managed to insure forest quality and sustainability.
--See appendices for list of expected plant and animal species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 3 St. John Oak Forest.

Map Key: 3 Resource District: 3 Critical Area: C

Quarter-Quarter Sections: SE/SE 5.

Total Acres: 10

Biotypes: Oak forest.

Aspect: North.

Slope: 10%

Important Functions and Values: a) wildlife support and reserve _for forest species; b) soil and water conservation; c) aesthetics and domestic tranquility; and d) oak regeneration.
Present Condition: Good, was pastured.
Preferred Uses: Local park or reserve.
Acceptable Uses: Low-density or cluster residential outside forest blocks with review of permits according to specific environmental standards.
Means of Control: a) public or Private purchase of land (or easements); and b) subdivision ordinances based on resource Performance standards.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; and c) oak populations (mature and saplings).
Additional Notes and Sources of Information:
--A more detailed inventory is needed in, this area.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 47 Airport Road Oak Savanna Restoration Site.

Map Key: 47 Resource District: 3 Critical Area: C

Quarter-Quarter Sections: NE/SW 5.

Total Acres: 5

Biotypes: Oak grove.

Aspect: Northeast.

Slope: 2%

Important Functions and Values: a) wildlife support; b) soil and water conservation; and c) scenic beauty.
Present Condition: Medium disturbance.
Preferred Uses: Waterway corridor buffer strip adjacent to open greenway.
Acceptable Uses: Residential with setbacks from corridor and design specifications based on resource performance standards.
Means of Control: a) subdivision ordinances with review of permits according to specific environmental standards that protect scenic beauty and water quality.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak regeneration; and d) continuity of corridor.
Additional Notes and Sources of Information:

--This area might be viewed as a wider ecological node in an environmental corridor (as with waterways or fencerows). When integrated properly in the landscape design, its value is built-in. Just designating a uniform width for a waterway corridor fails to use the natural system effectively.

--See appendices for list of expected plant and animal species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 65 St. John Oak Forest And Savanna Restoration Sites.

Map Key: 65 Resource District: 3 Critical Area: C

Quarter-Quarter Sections: 65(a), SE/SE 5 (1 acre), & 65(b), NE/SE 5 (2 acres).

Total Acres: 3

Biotypes: Forest and cemetery edges. Aspect: North.

Slope: 10%

Important Functions and Values: a) wildlife support; b) soil and ¯water conservation; c) community landmark lending aesthetic and domestic tranquility; and d) historic preservation.
Present Condition: Grass, brush and cemetery lawn.
Preferred Uses: Park and corridor between sites and an oak forest reserve.
Acceptable Uses: Low-density or cluster residential with screening and setbacks from corridor, cemetery, and oak forest, and with specifications based on resource performance standards.
Means of Control: a) subdivision ordinances with review of permits according to specific environmental standards that protect scenic beauty and history.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak regeneration; and) continuity of corridor.
Additional Notes and Sources of Information:
--Work with church to improve natural and cultural features.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 66 Airport Road Savanna and Oak and Prairie Restoration Site.

Map Key: 66 Resource District: 3 Critical Area: C

Quarter-Quarter Sections: NW/SW 5 (3 acres) & NE/SW 5 (3 acres).

Total Acres: 6

Biotypes: Oak savanna with grass cover.

Aspect: South, Southeast and East.

Slope: 10-20%

Important Functions and Values: a) wildlife support and reserve for oak savanna and prairie species; b) soil and water conservation; c) scenic beauty and historic preservation; and d) restoration potential.
Present Condition: Old pastured hill with open-grown oaks; natural savanna exists in place but north end is partly excavated for gravel.
Preferred Uses: small Local Park with buffer and screening around it.
Acceptable Uses: Low-density or cluster residential around exterior, with review of permits according to specific environmental standards that require sufficient setbacks.
Means of Control: a) public or private purchase of land (or easements); and b) subdivision ordinances based on resource performance standards.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak populations (mature and saplings); and d) native grassland species abundance and diversity: Additional Notes and Sources of Information:
--An excellent example of a small site were many natural amenities can be protected, restored, and made accessible with the proper design and management.
--See appendices for list of expected plant and animal species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON NATURAL RESOURCE DISTRICT EVALUATIONS

District Name: Western Highlands.

Map Key: 4

Sections: 19, 30, 31, & 32.

District Characteristics: A high, partly wooded, ridge at the west edge of glaciated region with low-density residential lots and some new subdivisions.

Topography: Narrow ridge, somewhat broader and kettle-dotted northward and steeper with narrow valleys southward, with elevations of 1100-1240 feet.
Geology: Terminal moraine over high dolomite ridge.
Vegetation: Oak forest, savanna, prairie relics, farm land, homestead plantings.
Soils: Silt loams on top of gravel over bedrock; many boulders.
Hydrology: Good infiltration with little surface runoff under normal, conditions (when surface is not covered over or compacted); important water recharge area
Natural History: Formerly oak forests with some oak savannas and prairies at the top of the Johnstown moraine--which marks the furthest advance by the last glacier in the township.
Scenic Beauty: The north-south corridor linking Black Earth Creek with the Driftless Area valleys provides excellent vistas with long viewsheds.
Historic Importance: Unique geological (glacial) features --transitional zone between terminal moraine and driftless landscape.
Most Important Natural Resources: Sustainable biotic diversity within forest blocks, savannas, prairies, ponds and sinks; scenic beauty and historic landmarks.' soil and water conservation.
Priority Land Use Objectives: Ice Age Trail, conservancy, and low-density residential, or selective clustering, provided that necessary design and management specifications are followed to protect the continuity of the woodland corridor.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: Trail Moraine Corridor.

Map Key: L Resource District: 4

Quarter Sections: SW 19 & NW 30.

Sensitive Sites: 8, 34(a), 34(b).

General Description: A narrow, one-mile long, north-south segment of the Johnstown terminal moraine; wooded with oaks.

Biotypes: Oak savanna and forest.

Watershed Characteristics: Setting--A narrow north and south ridge. Input Area--A narrow north-south ridge. Output--West to two ponds East to: Sugar River basin.

Slopes: 0-30%

Soils: Dresden and McHenry silt loams, erodible.
Land Uses: Former pasture, now in low-density residential development.
Most Important Natural Resources: Important forest and animal habitat; outstanding scenic area; historic terminal moraine with oak forest changing to oak savanna on the drier western slopes.
Natural Resource Management Requirements: Maintain existing mature oaks; provide for oak regeneration; encourage prairie restoration at openings and ingrate other appropriate native landscaping; and control runoff into sinks or ponds.
Priority Land Use Objectives: Maintain compatible low-density, residential with design and management specifications based on resource performance standards required to sustain forest: ecosystem functions, and scenic and historic landscape character.
Means of Control: a) subdivision ordinances with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land and easements; and c) education and Professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) oak density and regeneration; b) scenic elements of the viewshed, especially access from Timberlane Road; c) erosion and pollution; and d) pest species populations.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 34 Moraine West.

MapKey: 34(a), 34(b) Resource District: 4 Critical Area: L

Quarter-Quarter Sections: SW/SW 19 (20 acres), NW/SW 19 (10i acres), NW/NW 30 (20 acres)_, SW/NW 30 (10 acres) & SE/NW 30 (10 acres).

Total Acres: 70

Biotypes: 34(a) at west slope is mostly oak savanna; 34(b) at east slope is mostly oak forest.

Slope: 0-30%

Important Functions and Values: a) life support for animal and plant species; b) soil and water conservation; and C) scenic beauty and historic landmarks.
Present Condition: Large-lot residential use predominates; yards maintenance varies from left natural to mown lawns.
Preferred Uses: Large-lot residential with integrative native landscaping; open space corridor to west to Timberlane Road,
Acceptable Uses: Possible clustering of residential development at forest margins, but, with strict conformance to resource performance standards that guide both design and management.
Means of Control: a) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land and easements; and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) oak populations (mature and sapling); b) scenic elements of the viewshed, especially access from Timberlane Road; c) erosion and pollution; and d) pest species populations.
Additional Notes and Sources of Information: is a unique glacial landscape feature in southern Wisconsin so that a portion of the Ice Age Trail will presumably Pass through the area- Trail links throughout all corridors might encourage Public support for their better design and management (that is, their preservation).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 8 Five Sinks Oak Forest.

Map Key: 8 Resource District: 4 Critical Area: L, H

Quarter-Quarter Sections: SE/SW 18 (5 acres), SW/SE 18 (5 acres), NE/NW 19 (10 acres), & NW/NE 19 (10 acres).

Total Acres: 30

Biotypes: Oak forest with ponds and sinks.

Aspect: Various.

Slope: 0-20%

Important Functions and Values: a) life support for animal and plant species; b) soil and water conservation with special attention to groundwater recharge; and c) scenic beauty and historic geological landmarks.

Present Condition: Pastured, trees, brush and old field; now residential.

Preferred Uses: Large-lot residential with integrative native landscaping as currently planned.

Acceptable Uses: Possible clustering of residential development at forest margins, but with strict conformance to resource performance standards that guide both design and management.

Means of Control: a) subdivision ordinances or plat restrictions with review of $_{\text{permits}}$ according to resource performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land and easements; and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.'

Monitoring Requirements: a) oak populations (mature and sapling); b) scenic and historic landscape elements; c) erosion and pollution; d) species abundance and diversity;-and d) pest species populations.

Additional Notes and Sources of Information:

--This represents an unusually good opportunity to enhance forest wildlife with ponds. Developers have installed new ponds which need management so as to provide better wildlife habitat and ensure proper water quality.

--See appendices for list of expected plant and animal species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: Richardson Cave Block.

Map Key: N Resource District: 4, 6

Quarter Sections: SW 32 & NW 32.

Sensitive Sites: 29, 30.

General Description: East-sloping block of forests on back of terminal moraine, extending south of the Township.

Biotypes: Oak forest.

Watershed Characteristics: Setting--West rim of Sugar River basin. Input Area--Moraine including 180 acres. Output--Sugar River.

Slopes: 10%, locally steeper.

Soils: Dodge, Kidder, McHenry silt loams erodible.
Land Uses: Agricultural and residential.
Most Important Natural Resources: Part of an important forest corridor containing sinks and caves; groundwater recharge.
Natural Resource Management Requirements: Oak regeneration; erosion control; pest species control; scenic enhancement; and water quality management.
Priority Land Use Objectives: Wood-lots, sustainable agriculture, and low-density or clustered residential in open areas; possibly an Ice Age Trail (or other trail) feature.
Means of Control: a) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot, size and setbacks, protection of forests, slopes and sinks, erosion control and water quality management requirements with buffer zones especially at gullyheads; b) public or common private purchase of land and easements; and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) oak populations (mature and sapling); b) continuity and percent area of forest; c) scenic and historic landscape elements; d) erosion and pollution; e) species abundance and diversity (especially birds); and f) pest species populations.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 29 Valley View Oak Forest.

Map Key: 29 Resource District: 3, 4 Critical Area: N

Quarter-Quarter Sections: NE/NW 32 (15 acres).

Total Acres: 15

Biotypes: Oak forest and savanna.

Slope: 5%

Important Functions and Values: a) wildlife support and reserve for forest species; b) soil and water conservation; c) aesthetics and domestic tranquility; and d) oak regeneration.

Present Condition: Is currently being subdivided.

Preferred Uses: Large-lot residential with integrative native landscaping.

Acceptable Uses: Residential with naturalized landscaping.

Means of Control: a) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of forests, slopes and openings, erosion control and water• quality management requirements with buffer zones at margins; b) public or common private purchase of land and easements; and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.

Monitoring Requirements: a) oak populations (mature and sapling); b) continuity and percent area of forest; c) scenic and historic landscape elements; d) erosion and pollution; e) species abundance and diversity (especially birds); and f) pest species populations.

Additional Notes and Source6 of Information:

--Despite current development in area, oak trees and associations should saved.

--See appendices for savanna species list.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 30 Richardson Cave Oak Forests.

Map Key: 30 Resource District: 4 Critical Area: N

Quarter-Quarter Sections; NW/SW 32 (10 acres), SE/SW 32 (20 acres) & SE/NW 32 (10 acres).

Total Acres: 40

Biotypes: Oak forest.

Slope: 0-40%

Important Functions and Values: a) wildlife support and reserve for forest species; b) soil and water conservation; c) aesthetics and domestic tranquility; and d) groundwater recharge through sinks and caves.

Present Condition: Semi-natural, pastured.

Preferred Uses: Natural area or sustainable agricultural use with appropriate soil and water management.

Acceptable Uses: Low-density residential according to resource performance standards, with appropriate soil and water management.

Means of Control: a) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of forests, slopes and sinks, erosion control and water quality management requirements with buffer zones especially around sinks; b) public or common private purchase of land and easements; and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.

Monitoring Requirements: a) water quality at sinks; b) oak populations (mature and sapling); c) scenic and historic landscape elements; d) erosion and pollution; e) species abundance and diversity (especially birds and amphibians); and f) pest species populations.

Additional Notes and Sources of Information:

--The leaders of the Township should hold meetings, with representatives from Verona Township, the University of Wisconsin Golf Course, and the Ice Age Trail project to discuss how to assure corridor protection in the plan.

--A detailed biotic inventory is needed for sinks, caves, and cliffs.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON NATURAL RESOURCE DISTRICT EVALUATIONS

District Name: Driftless Slopes.

Map Key: 5

Sections: 30, 31, & 32.

District Characteristics: "Coulee country"; a partially wooded area of steeper ridges and naturally eroded narrow valleys. Topography: Steep ridges, narrow valleys and ravines.

Geology: Ancient, pre-glaciated landscape with dendritic drainageways cutting into dolomite and sandstone; overwashed with water-carried glacial deposits at some locations.

Vegetation: Oak forests, upland grasslands and agricultural fields, and meandering streams and riparian wetlands below, extending further southwest.

Soils: Silt lawns, highly erodible.

Hydrology: Dendritic drainageways flowing southward to the Sugar River.

Natural History: A variety of biotic habitats created by the deeply dissected bedrock; some caves and many internally drained sink areas where coarse glacial deposits have only loosely filled dendritic depressions at the terminal moraine or where exposed bedrock contains natural fissures.

Scenic Beauty: A diverse area providing inspiring vistas over expansive viewsheds as well as intimate foreground landscapes.

Historic Importance: Unique geological (pre-glacial) landscape features and early agricultural settlement patterns.

Most Important Natural Resources: Sustainable biotic and species diversity with forest blocks, savannas and sink ponds; scenic beauty and historic landmarks; headwaters of Sugar River (soil and water conservation); sustainable prime agricultural soils.

Priority Land Use Objectives: An ecologically suitable balance or residential and working landscapes; and access to biotic and historic features for aesthetic, educational and recreational purposes. Accommodation of Ice Age Trail or other similar public amenities (small nature parks with view points, forest conservancy areas, ski trails and the like).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: Timberlane Block.

Map Key: M Resource District: 4, 5

Quarter Sections: SW & SE 30, NE, NW, SW, & SE 31 & SW 32.

Sensitive Sites: 5, 31, 42, 55, 61, 62.

Area Description: Approximately 600 acres of steep, hilly moraine and driftless landscape with large blocks of forest and good forest regeneration sites.

Biotypes: Oak forest.

Watershed Characteristics: Setting--Wooded ridges and driftless (coulee) landscape. Input Area--675 acres. Output--Sugar lave' via many swales and ravines.

Slopes: 0-50%; mostly greater than 12%.

Soils: Dodge, Kidder, Dunbarton, New Glarus silt loams, and Elkmound sandy loam, all erodible.
Land Uses: Some agricultural; mostly platted and now being developed as residential.
Most Important Natural Resources: Geological contrast of the terminal moraine and the driftless landscape; large reserve of oak forest with upland grassland; surface groundwater and surface scenic vistas south and southwest into driftless country; corridor for potential recreation access (such as the Ice Age Trail) and for wildlife.
Natural Resource Management Requirements: Continuity of forest corridor; oak regeneration; control of erosion and pest species; maintenance of water quality; scenic and recreational access.
Priority Land Use Objectives: Oak forest conservancy, and low-density residential or sustainable agriculture; accommodate appropriate recreational opportunities.
Means of Control: a) overlay zoning of entire area as critical for forest - define as a special management district; b) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of forests, slopes and gullyheads, and erosion control and water quality management requirements with buffer zones especially at forest edges; c) public or common private purchase of land and easements; and d) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) oak populations (mature and sapling); b) scenic and historic landscape elements; c) erosion and pollution; d) species abundance and diversity (especially birds and amphibians); e) forest continuity and edge effects; and f) pest species populations.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 5 Timberlane Oak Forest.

Map Key: 5 Resource District: 4, Critical Area: M

Quarter-Quarter Sections: NE, NW, SW, & SE of SW 30 (70 acres), NW & SW of SE 30 (50 acres), NW & NE of NW 31 (60 acres), & NW of NE 31 (40 acres).

Total Acres: 220

Biotypes: Oak forest (very large continuous block).

Aspect: Various, but mainly southwest.

Slope: 0-50%, mostly steep.

Important Functions and Values: a) life support for animal and plant species; b) scenic beauty and historic geology; c) microclimate control; d) source for oak regeneration; and e) soil and water conservation.

Present Condition: Generally good: forest varied in tree age and composition with contiguous edges for regeneration; soil quality good, but some eroding waterways and ditches.

Preferred Uses: A few nature parks or scientific areas where not yet subdivided and built; one each on sandy loam and silt loam soils.

Acceptable Uses: Low-density residential with standards and design guidelines for erosion control, water quality management, and scenic and recreational easements.

Means of Control: a) set within a special management district; b) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of forests, slopes and gullyheads, and erosion control and water quality management requirements with buffer zones especially at forest edges; c) public or common private purchase of land and easements (formation of a conservation land trust); and d) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping; e) public right-of-way for recreational trail establishment and maintenance.

Monitoring Requirements: a) oak populations (mature and sapling); b) scenic and historic landscape elements; c) erosion and pollution; d) species abundance and diversity (especially birds and amphibians); e) forest continuity and edge effects; f) pest species populations; and g) natural groundcover on built properties.

Additional Notes and Sources of Information:

--Summer survey of biota is needed in order to prioritize areas for particular values and land use objectives.

--Excellent natural vegetation in right-of-way on Timberlane Road needs protection.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 31 Driftless Oak Forest.

Map Key: 31(a), 31(b) Resource District 4, 5 Critical Area: M

Quarter-Quarter Sections: SW/NW 31 (5 acres), NW/SW 31 (15 acres), SW/SW 31 (2 acres), NE/SE 31 (3 acres), SE/SW 31 (25 acres)

Total Acres: 105

Biotypes: Oak forest.

Aspect: West, East, but mainly South.

Slope: 0-30%

Important Functions and Values: a) life support for animal and plant species (as part of the Timberlane Forest, special management district); b) scenic beauty and historic geology (only portion of the Town in the Driftless area); c) microclimate control; d) source for oak regeneration; and e) soil and water conservation.

Present Condition: Varied, generally good.

Preferred Uses: One or two conservancy or scientific areas acquired by fee simple or easement.

Acceptable Uses: Low-density residential with standards and design guidelines for erosion control, water quality management, and scenic and recreational easements.

Means of Control: a) set within a special management district; b) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of forests, slopes and gullyheads, and erosion control and water quality management requirements, with buffer zones especially at forest edges; c) public or common private purchase of land and easements (formation of a conservation land trust); d) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping; and e) public right-of-way for recreational trail establishment and maintenance.

Monitoring Requirements: a) oak populations (mature and sapling); b) scenic and historic landscape elements; c) erosion and pollution; d) species abundance and diversity (especially birds, and amphibians); e) forest continuity and edge effects; f) pest species populations; and g) natural groundcover on built properties.

Additional Notes and Sources of Information:

--A detailed survey of biota is needed in order to prioritize areas for particular values and land use objectives.

--Management for amphibian-crossing at Timberland Road is important and should be considered.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 42 Knollwood Savanna.

Map Key: 42 Resource District: 4, 5 Critical Area: M

Quarter-Quarter Sections: SE/NW 31 (10 acres) & NW/SW 31 (20 acres).

Total Acres: 30

Biotypes: Oak savanna.

Aspect: Northwest and Southwest.

Slope: 20%

Important Functions and Values: a) life support for animal and plant species (as part of the Timberlane Forest, special management district); b) scenic beauty and historic geology (only portion of the Town in the Driftless area); c) source for oak regeneration; and d) soil and water conservation.

Present Condition: Scattered oaks in old pasture.

Preferred Uses: Community Park.

Acceptable Uses: Low-density residential with standards and design guidelines for erosion control, water quality management, and scenic and recreational easements.

Means of Control: a) set within .a special management district (the Timberlane Forest Reserve); b) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of forests, slopes and gullyheads, and erosion control and water quality management requirements with buffer zones especially at grassland margins; c) public or common private purchase of land and easements (formation of a conservation land trust); and d) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.

Monitoring Requirements: a) oak populations (mature and sapling); b) scenic and historic landscape elements; c) erosion and pollution; d) species abundance and diversity (especially birds and amphibians); e) forest continuity and edge effects; f) pest species populations; and g) natural groundcover on built properties.

Additional Notes and Sources of Information:

--This is an opportunity to maintain a historic landscape by means of neighborhood education and cooperation.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 55 Cherrywood Oak Forest and Savanna Restoration Sites

Map Key: 55 Resource District: 4 Critical Area: M

Quarter-Quarter Sections: NW/SW 30 (30 acres), SW/SW .30 (20 acres), NW/SE 30 (10 acres), SW/SE 30 (10 acres), SE/SW 31 (25 acres), NE/NW 31 (5 acres), & NW/NW 31 (5 acres). Total Acres: 105

Biotypes: Old fields on development plat.

Aspect: West and East.

Slope; 10-20%

Important Functions and Values: a) life support for animal and plant species (as part of the Timberlane Forest, special management district); b) scenic beauty and historic geology; source for oak regeneration and prairie colonization; and soil and water conservation.

Present Condition: Varied, mostly old fields and residential building sites.

Preferred Uses: Low-density residential development, based on resource performance standards, and integrated into natural corridors.

Acceptable Uses: Low-density residential with standards and design guidelines for erosion control, water quality management, and scenic and recreational easements.

Means of Control: a) set within a special management district (the Timberlane Forest Reserve); b) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of forests, slopes and gullyheads, and erosion control and water quality management requirements with buffer zones especially at grassland margins; c) public or common private purchase of land and easements (formation of a conservation land trust); and d) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.

Monitoring Requirements: a) oak populations (mature and sapling); b) scenic and historic landscape elements; c) erosion and pollution; d) species abundance and diversity (especially birds and amphibians); e) forest continuity and edge effects; f) pest species populations; and g) natural groundcover on built properties.

Additional Sources of Information:

--One waterway in SW/NW 30, presently in natural grass groundcover, is a useful model for further stormwater greenway restoration projects in the developing areas (drainageways wherein intensive agricultural areas have become degraded).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EAVLUATIONS

Site Name: 61 Driftless Oak Forest Savanna

Restoration Sites.

Map Key: 61(a), 61(b) Resource District: 4 Critical Area: M

Quarter-Quarter Sections: SE/SW 31 (10 acres) & SW/NW 31 (10 acres).

Total Acres: 20

Biotypes: Old fields.

Aspect: South.

Slope: 20%

Important Functions and Values: a) life support for animal and plant species (as part of the Timberlane Forest, special management district); b) scenic beauty and historic geology; source for oak regeneration and prairie colonization; and soil and water conservation.

Present Condition: Pastures and old fields.

Preferred Uses: Forest edge buffer areas.

Acceptable Uses: Sustainable agriculture and low-density residential with standards and guidelines in design for scenic enhancement, erosion control, and water quality improvement.

Means of Control: a) set within a special management district (the Timberlane Forest Reserve); b) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of forests, slopes and gullyheads, and erosion control and water quality manager requirements with buffer zones especially at drainageways; c) public or common private purchase of land and easements (formation of a conservation land trust); and d) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.

Monitoring Requirements: a) oak populations (mature and sapling); b) scenic and historic landscape elements; c) erosion and pollution; d) species abundance and diversity (especially birds and amphibians); e) forest continuity and edge effects; f) pest species populations; and g) natural groundcover on built properties.

Additional Notes and Sources of Information:

--An attempt should be made to incorporate this area in the special forest management district and to create resource performance standards that apply to the entire area, comprehensively.

--See appendices for list of expected species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 62 Knollwood Oak Forest Savanna Restoration Sites.

Map Key: 62 Resource District: 4, 5 Critical Area: M

Quarter-Quarter Sections: SW/NE 31 (40 acres), SE/NE 31 (15 acres), NW/SE 31 (30 acres), NE/SE 31 (35 acres), SW/NW 31 (20 acres), SE/NW 31 (40 acres), NE/SW 31 (20 acres), & NW/SW 32 (10 acres).

Total Acres: 200

Biotypes: Old fields and forest edges.

Aspect: South and West.

Slope: 0-30%

Important Functions and Values: a) life support for animal and plant species (as part of the Timberlane Forest, special management district); b) scenic beauty and historic geology; c) source for oak regeneration, either as forest or savanna, and prairie colonization; and d) soil and water conservation.

Present Condition: Old fields, farms, residential plats.

Preferred Uses: Low-density residential which incorporates waterways and forest edges (of each parcel) into natural corridors and favors oak regeneration, especially on sandy soils and steep slopes.

Acceptable Uses: Low-density residential with standards and guidelines in design for continuity of corridor, scenic enhancement, savanna restoration, erosion control, and water quality improvement.

Means of Control: a) set within a special management district (the Timberlane Forest Reserve); b) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot ¯size and setbacks, protection of forests, slopes and gullyheads, and erosion control and water• quality management requirements with buffer zones especially at drainageways; c) public or common private purchase of land and easements (formation of a conservation land trust); and d) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.

Monitoring Requirements: a) oak populations (mature and sapling); b) scenic and historic landscape elements; c) erosion and pollution; d) species abundance and diversity (especially birds and amphibians); e) forest continuity and edge effects; f) pest species populations; and g) natural groundcover on built properties.

Additional Notes and Sources of Information:

--Further inventory is required to incorporate the most important corridor and buffer sites comprehensively.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON NATURAL RESOURCE DISTRICT EVALUATIONS

District Name: Sugar River Basin.

Map Key: 6

Sections: 19, 20, 28, 29, 30, 32, & 33.

District Characteristics: A large, mostly open and rolling agricultural (working) landscape and head of the Sugar River drainage basin (or watershed).

Topography: Shallow valley heads in a steeper rim of sandstone with moderate decreases in elevation to the south, and intermittent, meandering waterways.

Geology: Pre-glacial valleys, mostly filled with glacial outwash.

Vegetation: Now mostly cropland; some smaller woods and prairie relics at rims and near some homesteads.

Soils: Silt loams; deeper in basin (river bottom) shallow on rims.

Hydrology: Important infiltration field; little runoff and intermittent streambeds imply internal drainage--this is a valuable groundwater recharge area with frequent sinks and even caves (though now filled with rubble, historic records show caves in the area) that provide direct routes for surface water flow into openings in the sedimentary bedrock.

Natural History: The landscape was formerly made up of oak forests, oak savannas, prairies, wet prairie pot holes and riparian wetlands.

Scenic Beauty: Rural working landscape; farmhouses, barns, woodlots, pastures and cornfields.

Historic Importance: Natural drainageways, restorable prairies, and early settlement landscape.

Most Important Natural Resources: Native prairie and grassland as habitat for wildlife and as a necessary element of the natural system to ensure groundwater protection (the design of open green space should depend firstly on: surface and groundwater resource requirements throughout the Town); sustainable working landscape centered on the constructive use of prime agriculture soils; scenic beauty and historic landmarks; educational and recreational opportunities for West Middleton Elementary School and other Town schools.

Priority Land Use Objectives: Sustainable, working agricultural landscape with special attention given to soil and groundwater conservation; prairie restoration; education. It is especially important that the natural topography and landforms be protected throughout all natural areas in the Town, but it is even critical that development sites not be artificially re-graded within basins that are internally drained.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: School Island.

Map Key: R Resource District: 6

Quarter Sections: SW 29, NW 29, SE 30, & NE 30. Sensitive Sites: Forest, 6, 50, & 63; grassland, 83.

General Description: Natural elements of the original landscape near West Middleton elementary school, most suitable for an expanded restoration, project; a nearly level to sloping cropland area, internally drained.

Biotypes: Oak forests, oak savanna, stony ridge, regeneration, restored prairie.

Watershed Characteristics: Setting--West part of Badger Mill Creek valley. Input Area--1000 acres. Output--Sugar River via intermittent waterways and sinks.

Slopes: 0-10%

Soils: In oak forests and along fencerows--Dodge, Kidder, Plano silt loams, erodible; at school prairie--Plano, Ringwood, Troxel silt loams.

Land Uses: Agricultural between forest and school.

Most Important Natural Resources: Diversity of natural habitats and geological features, convenient to the school for natural education purposes; rich, well drained soils for agriculture.

Natural Resource Management Requirements: Sustainable agriculture and protection of natural infiltration areas; oak regeneration; conservation reserve grassland at ridge; and control of erosion and pest species.

Priority Land Use Objectives: Natural areas for education and open green space for more traditional farming (the model throughout the Sugar River Basin should be farming in the low basins with limited residential development, according to resource performance standards, on the thin soils of the 'surrounding, moderate upland slopes).

Means of Control: Public or private acquisition, either fee simple or as easements and conservation or farm land trusts; also, transfer of development rights based on agricultural resource preservation.

Monitoring Requirements: a) oak population (mature and sapling); b) erosion and vandalism; c) pest species populations; d) plant and animal species abundance and diversity; and e) groundwater quantity and quality.

Additional Notes and Sources of Information:

--Other elements of educational use could include exploration into the topics of sustainable farming and gardening.

--This location could be one for neighborhood projects, and might serve as an environmental education and information meeting place (somewhat removed from the normal business of the Town Hall).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 6 Schoolview Forest.

Map Key: 6 Resource District: 6 Critical Area: R

Quarter-Quarter Sections: SE/NE 30 (10 acres).

Total Acres: 10

Biotypes: Oak forest.

Aspect: Northeast.

Slope: 5%

Important Functions and Values: a) life support for' forest and forest edge species; b) soil and water conservation; c) educational and historic oak woods; and d) openings for oak regeneration.

Present Condition: Good: trails already present; a few pest species.

Preferred Uses: Nature park for passive recreation and education This is the only natural forest accessible to West Middleton elementary school which does not require crossing a major roadway; it is also accessible to Cherrywood residents and provides a scenic view point of high quality; preservation of the connecting fencerow on the south edge would tie the woods to the Timberlane Forest, constructively (this fencerow should also continue east at the base of the conservation reserve land).

Acceptable Uses: Conservancy with restriction on adjacent, very low-density residential development, to preserved area accessible to school and maintain quality of the forest edge.

Means of Control: a) acquisition of land (and conservation easements), including incorporation of the east-west fencerow, preserving the natural access corridor; b) responsible farm stewardship throughout the valley; and c) education and professional advice about single lot and neighborhood conservation plans, that include integrative native landscaping, especially on properties contiguous to the natural system.

Monitoring Requirements: a) oak populations, (mature and sapling) and "den" trees; b) scenic and historic landscape elements; c) erosion, pollution and vandalism; d) species abundance and diversity (especially birds and amphibians); e) forest continuity and edge effects; f) pest species populations; and g) natural groundcover on built properties.

Additional Notes and Sources of Information:

--The elementary school already has an ecological curriculum, allowing teachers and students to be involved in the design and management of the Town's natural systems.

(Zimmerman & Kailing, 1990)

TOWN OF'MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 50 South School Oak Savanna Regeneration Site.

Map Key: 50 Resource District: 6 Critical Area: R

Quarter-Quarter Sections: NW/SW 29 (10 acres).

Total Acres: 10

Biotypes: Fencerow and old field with oak regeneration.

Slope: 10-20%

Important Functions and Values: a) life support for savanna and grassland species; b) educational and historic landform; c), recreation; and d) soil and water conservation.
Present Condition: Natural, sloping to south in fallow, terraced hayfields; plowed on the north side.
Preferred Uses: Conservation reserve for natural science education and old field bird habitat.
Acceptable Uses: Very low-density residential development, according to resource performance standards, with trail corridor easement.
Means of Control: a) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of grassland slopes, erosion control and water quality management requirements with buffer zones at drainageways; b) public or common private purchase of land and easements (especially for school access); and c) education and professional advice about area management, and single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) vandalism; b) populations of oaks (saplings); c) scenic and historic landscape elements; d) erosion and pollution; e) species abundance and diversity (especially birds); f) ecosystem continuity and edge effects; and f) pest species populations.
Additional Notes and Sources of Information:
--This is a very exciting natural east-west corridor with high scenic and wildlife values.
--Monitoring of plant and animal life should start immediately under supervision of a naturalist.
--See appendices for list of expected species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALIONS

Site Name: 63 Tumbledown Oak Savanna Regeneration Site.

Map Key: 63 Resource District: 6 Critical Area: R

Quarter-Quarter Sections: NW/SW 29 (30 acres).

Total Acres: 30

Biotypes: Old fields with a few trees.

Aspect: Northeast.

Slope: 10-20%

Important Functions and Values: a) life support for savanna and grassland species; b) educational and historic landform; c) oak savanna regeneration; and d) soil and water conservation.

Present Condition: Old field with gullies and terraces.

Preferred Uses: Conservation reserve for natural science education, passive recreation, and grassland and oak savanna restoration.

Acceptable Uses: Very low-density residential development, according to resource performance standards, with open oak and grassland areas, with an easement for school purposes.

Means of Control: a) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of grassland slopes, erosion control and water quality management requirements with buffer plantings at drainageways; b) public or common private purchase of land and easements (especially for school access); and c) education and professional advice about area management, and single lot and neighborhood conservation plans that include integrative native landscaping for surrounding properties.

Monitoring Requirements: a) vandalism; b) populations of oaks (saplings); c) scenic and historic landscape elements; d) erosion and pollution; e) species abundance and diversity (especially birds); f) ecosystem continuity and edge effects; and f) pest species populations.

Additional Notes and Sources of Information:

--This could be a desirable extension of the school forest project for a savanna.

--See appendices for list of expected plant and animal species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 83 West Middleton Elementary School Prairie Restoration Site.

Map Key: 83 Resource District: 6 Critical Area: R

Quarter-Quarter Sections: NW/NW 29.

Total Acres: 1

Biotypes: Native prairie.

Slope: flat.

Important Functions and Values: a) educational; b) seed source and life support for prairie species; and 6) enhancement of the natural groundwater infiltration system (study point for groundwater recharge).
Present Condition: Good plant species diversity already evident.
Preferred Uses: Education and research.
Acceptable Uses: Public visitation and passive recreation.
Means of Control: a) continued school ownership; b) responsible conservation management by a local steward; d) some restricted access.
Monitoring Requirements: a) vandalism; b) prairie plant species abundance and diversity; c) animal populations and diversity; d) pest species populations.
Additional Notes and Sources of Information:
--Plat contains a sink needing protection from contaminated agricultural run-off.
--See appendices for tallgrass prairie plant list.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: Sugar River• Basin.

Map Key: S Resource District: 6

Quarter Sections: SW 17, SE 18, NE, SW, & SE 19, NW, NE, SW, & SE 20, SW 21, SW 27, NW, NE, SW, & SE 28, NW, NE, SW, & SE 29, NW, NE, & SE 30, NW, NE, & SE 32, NW, NE, SW, & SE 33.

Sensitive Sites: 7, 16, 24, 28, 36, 39, 40, 48, 49, 56, 59, 80, & 81.

General Description: Large, open, shallow-lobed basin rimmed by moraines and outcrops of St. Peter sandstone; 1100-1150 foot elevations.

Biotypes: Mostly agricultural with many small forest blocks, savannas, grasslands, and sinks.

Watershed Characteristics: Setting--Southwest edge of recessional moraine, draining to the west and south. Input Area--420 acres. Output--Evapotranspiration, infiltration (groundwater recharge), and surface drainage to the Sugar River.

Slopes: Central basin, 0-10% and rims, 10-20%.

Soils: Silt loams with thin soils (and exposed rock) on rims. Land Uses: Agricultural with scattered residences and a few larger nursery enterprises.

Most Important Natural Resources: Open grassland on marginal rims (CRP lands) as habitat for wildlife, and as a necessary element of the natural system to ensure groundwater protection (the design of open green space should depend firstly on surface and groundwater resource requirements throughout the Town); sustainable working landscape centered on the constructive use of prime agriculture soils; and scenic beauty and historic landmarks.

Natural Resource Management Requirements: Open space; soil and groundwater conservation; grassland and oak savanna restoration on rims; and improved green drainageways in basin. It is important that the natural topography and landforms be protected throughout all natural areas in the Town, and that development sites not be artificially regraded, especially within basins that are internally drained.

Priority Land Use Objectives: Sustainable, working agricultural landscape; conservancy areas (CRP lands); and residential development according to resource performance standards (on very moderate slopes).

Means of Control: Overlay zoning for agricultural and conservancy; large-lot and cluster residential, according to resource performance standards; transfer of development rights; public or private purchase of land (or easements); and local conservation plans.

Monitoring Requirements: a) Oak population (mature and sapling); b) open space and farms; c) erosion and natural cover; d) pest species populations; e) sustainable agricultural practices; f) grassland wildlife populations (especially birds).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 7 Northeast Nineteen Oak Forest.

Map Key: 7 Resource District: 6 Critical Area: S

Quarter-Quarter Sections: NE/NE 19, NW/SE 19, & NE/SE 19.

Total Acres: 40

Biotypes: Oak forests and connecting fencerows.

Aspect: North and South.

Slope: 0-20%

Important Functions and Values: a) wildlife support; b) soil and water conservation; and c) scenic beauty.
Present Condition: Disturbed by grazing.
Preferred Uses: Sustainable agriculture.
Acceptable Uses: Low-density or clustered residential according to resource performance standards.
Means of Control: a) subdivision ordinances or plat restrictions with requirements based on specific environmental standards, including setbacks; and b) public or, private purchase of land (or easements).
Monitoring Requirements: a) pest species populations; b) erosion and pollution; and c) oak populations (mature and saplings).
Additional Notes and Sources of Information:
--Site may have important geological features.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 16 Elderberry Oak Forest.

Map Key: 16 Resource District: 6 Critical Area: S

Quarter-Quarter Sections: SE/NE 20.

Total Acres: 5.

Biotypes: Oaks with a few floodplain trees.

Aspect: Southeast.

Slope: 30%

Important Functions and Values: a) life support (especially as part of a north-south fencerow corridor system); b) soil and water' conservation; and c) scenic beauty and historic geological landmark.
Present Condition: Some erosion and trash dumping, otherwise good.
Preferred Uses: Conservancy with associated sustainable agriculture.
Acceptable Uses: Low-density or clustered residential, according to resource performance standards, outside of forest block.
Means of Control: a) subdivision ordinances or plat restrictions with requirements based on specific environmental standards, including setbacks; b) public or private purchase of land (or easements); and c) education and professional advice about area management, and single lot and neighborhood conservation plans that include integrative native landscaping for surrounding properties.
Monitoring Requirements: a) pest species populations; b) erosion, pollution, and vandalism; and c) oak population (mature and sapling).
Additional Notes and Sources of Information:
--This site has very interesting biotic and geological diversity.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 24 Thirty-three Southwest Oak Forests.

Map Key: 24 Resource District: 6 Critical Area: S

Quarter-Quarter Sections: NE/SW 33 (8 acres) & SE/SW 33 (6 acres).

Total Acres: 14

Biotypes: Oak forests.

Aspect: West.

Slope: 0-10%

Important Functions and Values: a) wildlife support; b) soil and water conservation; and c) scenic beauty.
Present Condition: Moderate disturbance.
Preferred Uses: Sustainable agriculture.
Acceptable Uses: Low-density or clustered residential, according to resource performance standards, outside of forest block.
Means of Control: a) subdivision ordinances or plat restrictions with requirements based on specific environmental standards, including setbacks; b) public or private purchase of land (or easements); and c) education and professional advice about forest management, and single lot and neighborhood conservation plans that include integrative native landscaping for surrounding properties.
Monitoring Requirements: a) pest species populations; b) erosion, pollution, and vandalism; and c) oak population (mature and sapling).
Additional Notes and Sources of Information:
--Oak forest regeneration sites should be located throughout the Town to ensure their continuance.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 28 South Point Oak Forest.

Map Key: 28 Resource District: 6 Critical Area: S

Quarter-Quarter Sections: SW & SE of SW 28 (slope) & NW of SW 28 (sink).

Total Acres: 30

Biotypes: Oak forests (and floodplain trees in sink area).

Aspect: North.

Slope: 15%

Important Functions and Values: a) life support; b) soil conservation; and c) groundwater recharge.
Present Condition: Sink area dry in 1989.
Preferred Uses: Sustainable agricultural with attention to water quality and special conservation management of all internally drained spots.
Acceptable Uses: Low-density or cluster residential, according resource performance standards, around exteriors of wooded slopes.
Means of Control: a) Subdivision ordinances or plat restrictions based on specific environmental standards, including setbacks, screening, and buffer zones at forest edges; b) public acquisition or easement; and c) education and professional advice about forest management, and single lot and neighborhood conservation plans that include integrative native landscaping for surrounding properties.
Monitoring Requirements: a) pest species populations; b) erosion, pollution, and vandalism; c) oak population (mature and sapling); and d) water quality of runoff at sink locations.
Additional Notes and Sources of Information:
--All sink areas need careful scrutiny to determine best management strategies.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 36 St. Peter Savanna.

Map Key: 36 Resource District: 6 Critical Area: S

Quarter-Quarter Sections: SE/NE 20.

Total Acres: 10

Biotypes: Oak savanna.

Aspect: South.

Slope: 150%

Important Functions and Values: a) life support for savanna and grassland species; b) educational, historic geology; c) openings for oak regeneration; and d) scenic beauty.
Present Condition: Pasture.
Preferred Uses: Conservancy or• park associated with adjacent sustainable agriculture.
Acceptable Uses: Low-density or cluster residential according to resource performance standards, outside forested slopes.
Means of Control: a) Subdivision ordinances or plat restrictions with setbacks; and b) public acquisition or easement.
Monitoring Requirements: a) pest species populations; b) erosion and groundcover; c) oak regeneration and density.
Additional Notes and. Sources of Information:
--This site has very interesting biotic and geological diversity and would provide a good area for a local park.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 39 Mineral Point Savanna.

Map Key: 39 Resource District: 8 Critical Area: T, S

Quarter-Quarter Sections: SE/SE 21, SE/SW & SW/SE 21, NW/NE & NW/NW 28, & NE/NE 29.

Total Acres: 30

Biotypes: Savanna homesteads with horticultural plantings.

Aspect: Southeast.

Slope: 0-5%

Important Functions and Values: a) a life support system for wildlife; and b) scenic beauty and historic landmarks (homestead sites).
Present Condition: Medium impact, mixed species.
Preferred Uses: Sustainable agriculture at surroundings; very low-density resident residential with no new development, as either residential or commercial.
Acceptable Uses: Low-density or clustered residential according to resource performance standards.
Means of Control: a) Subdivision ordinances or plat restrictions based on specific environmental standards, including setbacks, screening, and buffer zones at margins; b) public acquisition or easement; and c) education and professional advice about forest management, and single lot and neighborhood conservation plans that include integrative native landscaping for residential properties and buffering of surrounding farm land.
Monitoring Requirements: a) pest species populations; b) erosion, pollution, and vandalism; c) oak population (mature and sapling); and d) water retention and quality of runoff.
Additional Notes and Sources of Information:
--Native landscaping within settlements will provide community benefits, overall.
--The interspace between farmland and residential properties should be made more functional to mitigate certain disturbances associated with conflicting land use.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 40 Maple Lane Savanna.

Map Key: 40 Resource District: 6 Critical Area: S

Quarter-Quarter Sections: SW/NW 33

Total Acres: 10

Biotypes: Oak savanna.

Important Functions and Values: a) a life support system for wildlife; and b) scenic beauty and historic landmarks (homestead sites).
Present Condition: Disturbance from pasture and other; abundant, well-spaced trees.
Preferred Uses: Sustainable agricultural.
Acceptable Uses: Low-density residential or small park.
Means of Control: a) Subdivision ordinances or plat restrictions based on specific environmental standards, including setbacks, screening, and buffer zones at margins; b) public acquisition or easement; and c) education and professional advice about savanna management, and single lot and neighborhood conservation plans that include integrative native landscaping for residential properties and functional buffering of surrounding farm land.
Monitoring Requirements: a) pest species populations; b) erosion, and Pollution; c)oak Population nature and sapling); and d) water retention and quality of runoff.
Additional Notes and. Sources of Information:
--The interspace between farmland and residential properties should be made more functional to mitigate certain disturbances associated with conflicting land use.
--See appendices for list of expected savanna species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 48 West Middleton Settlement Forests and Savanna Restoration Sites.

Map Key: 48 Resource District: 6 Critical Area: S

Quarter-Quarter Sections: SE/SW 20 (5 acres, church), SW/SE 20 (3 acres, cemetery), SE/SW 20 (5 acres, residential) & NE/NW 29 (40 acres, residential).

Total Acres: 53

Biotypes: Oaks and plant trees (mostly lawns and gardens).

Aspect: South.

Slope: 0-10%

Important Functions and Values: a) a life support system for wildlife; b) soil and water conservation; and c) scenic beauty and historic landmarks.
Present Condition: Residential; church and cemetery.
Preferred Uses: Restoring and maintaining an oak savanna within the context of the existing developed area to provide enduring human comfort by climate amelioration and the preservation of important elements of the Town's natural heritage.
Acceptable Uses: No other.
Means of Control: a) Professional advice on heritage design and the integration of native species associations in the landscaping; and b) continued stewardship.
Monitoring Requirements: a) pest species populations; b) groundcovers; c) oak densities and population (mature and sapling).
Additional Notes and Sources of Information:

--All historic elements, whether natural or cultural, are important to preserving the Town's local character.

--See appendices for list of expected savanna species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 49 Hilltop Oak Forest Savanna Restoration Site.

Map Key: 49 Resource District: 8 Critical Area: S

Quarter-Quarter Sections: SE/NE 29 (40 acres, slope), & SW/SE 29 (20 acres, fenceline).

Total Acres: 60

Biotypes: Scrubby old field with fencerow.

Aspect: South.

Slope: 0-20%

Important Functions and Values: a) life support for grassland animal and plant species; b) scenic beauty and historic geology; c) source for oak regeneration, as savanna, and prairie colonization; and d) soil and water conservation.
Present Condition: Old field, abandoned pasture, and adjacent earth moving.
Preferred Uses: Oak savanna, grassland, and sustainable agriculture.
Acceptable Uses: Low-density residential with standards and guidelines in design for continuity of hedgerow corridors, scenic enhancement, savanna restoration, erosion control, and water quality improvement.
Means of Control: a) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of oak trees, marginal grasslands, slopes and natural drainageways, and erosion control and water quality management requirements; b) public or common private purchase of land and easements; and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) oak populations (mature and sapling); b) scenic and historic landscape elements; c) erosion and pollution; d) species abundance and diversity (especially birds; e) grassland continuity and edge effects; f) pest species populations; and g) natural groundcover on built properties.
Additional Notes and Sources of Information:
--Probable sink in SW/SE 29 should be inventoried and protected.
--All excavation and grading that modifies the natural drainage patterns or local topography should be strictly avoided.
--See appendices for expected species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 56 Twin Valley Oak Forest Savanna Restoration Site.

Map Key: 56 Resource District: 6 Critical Area: S

Quarter-Quarter Sections: SE/SW 17 (5 acres) & NW/NW 20 (10 acres).

Total Acres: 15

Biotypes: Homesteads with some trees.

Aspect: Southeast.

Slope: 0-10%

Important Functions and Values: a) life support of some savanna animal and plant species (especially birds); b) scenic beauty, historic geology, and domestic tranquility; and c) soil and water conservation.
Present Condition: Normal residential impacts.
Preferred Uses: Low-density residential with exclusively native savanna landscaping.
Acceptable Uses: Low-density residential with standards and guidelines in design for continuity of hedgerow corridors, scenic enhancement, savanna restoration, erosion control, and water quality improvement.
Means of Control: a) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of oak trees, marginal grasslands, slopes and natural drainageways, and erosion control and water quality management requirements; b) public or common private purchase of land and easements; and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) oak populations (mature and sapling) b) scenic and historic landscape elements; c) erosion and pollution; d) species abundance and diversity (especially birds; e) grassland continuity and edge effects; f) pest species populations; and g) natural groundcover on built properties.
Additional Notes and Sources of Information:

--All excavation and grading that modifies the natural drainage patterns or local topography should be strictly avoided.

--See appendices for expected species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 59 Valley View Oak Savanna Restoration Site.

Map Key: 59 Resource District: 6 Critical Area: S

Quarter-Quarter Sections: NW/NE 33.

Total Acres: 30

Biotypes: Oaks with a few floodplain trees.

Aspect: Southeast.

Slope: 30%

Important Functions and Values: a) wildlife support; b) soil and water conservation; c) scenic beauty and historic geology; and d) human comfort and domestic tranquility.

Present Condition: Generally disturbed.

Preferred Uses: Marginal savanna, grassland with surrounding sustainable agriculture.

Acceptable Uses: Low-density residential with standards and guidelines in design for continuity of hedgerow corridors, scenic enhancement, savanna restoration, erosion control, and water quality improvement.

Means of Control: a) subdivision ordinances or plat, restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of oak trees, marginal grasslands, slopes and natural drainageways, and erosion control and water quality management requirements; b) public or common private purchase of land and easements (and formation of a local conservation land trust); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.

Monitoring Requirements: a) oak populations (mature and sapling); b) scenic and historic landscape elements; c) erosion and pollution; d) species abundance and diversity (especially birds; e) grassland continuity and edge effects; f) pest species populations; and g) natural groundcover on built properties.

Additional Notes and Sources of Information:

--This site presents an excellent opportunity to restore a savanna. It is part of a group of natural resource restoration opportunities (see Sensitive. Site 80, across from Valley View Road) which may be of interest to neighboring residents, and lead to a land trust.

--The Forest Products Lab test plot is adjacent to western edge of the site.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 80 Reserve Prairie Restoration.

Map Key: 80 Resource District: 6 Critical Area: S

Quarter-Quarter Sections: SW/SE 28 (40 acres), & SW/SW & SE/SW 28 (80 acres).

Total Acres: 120

Biotypes: Fallow hayfields.

Aspect: Northeast and Northwest.

Slope: 0-15%

Important Functions and Values: a) wildlife support; b) soil and water• conservation; and c) scenic beauty, farm tradition, and historic geology (shallow rocky outcrop under thin soil).

Present Condition: Fallow hayfields in Conservation Reserve Program.

Preferred Uses: Private, prairie restoration and wildlife reserve.

Acceptable Uses: Conservancy with special wildlife management program; continuation in CRP program.

Means of Control: a) Public acquisition or easement (or protection through formation of a conservation land trust); or b) continuation of CRP program with wildlife management specifications and prairie restoration.

Monitoring Requirements: a) prairie bird populations; b) pesticide use and mowing; and c) erosion.

Additional Notes and Sources of Information:

--Prairie wildlife requires large open spaces of grass for breeding purpose; these areas should not be sprayed and mowing should be done only after mid-July. Native prairie restoration could be done, and would be ideal (European grasses may suffice).

--No CRP program land should be allowed to go to development before it is closely inspected for its conservancy potential and planned accordingly. CRP should not provide economic loop-holes for speculative development.

--See appendices for expected prairie species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 81 St. Peter Rim Prairie Restoration Site.

Map Key: 81(a), 81(b) Resource District: 6 Critical Area: S

Quarter-Quarter Sections: 81(a), SW/NE & SE/NE 20 (30 acres); 81(b) SW/NW 21 (1 acre).

Total Acres: 31

Biotypes: 81(a), pasture and 81(b) sandstone outcrop.

Aspect: 81(a) East and 81(b) Southeast.

Slope: 81(a), 15%; and 81(b), 15-60%.

Important Functions and Values: a) wildlife support; b) soil and water conservation; and c) scenic beauty, farm tradition, and historic geology (rocky sandstone outcrop).
Present Condition: Pasture, old field, and fallow cropland.
Preferred Uses: Nature Park or conservancy.
Acceptable Uses: Very limited and sustainable agricultural (only for site portion 81(a)).
Means of Control: a) public acquisition or easement, or protection and management through the formation of a conservation land trust.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) native plant and animal populations; and d) grazing and pesticides.
Additional Notes and Sources of Information:

--Two native prairie species grow on the outcrop; the thin soils and presence of savanna (Sensitive Site 36) along with exceptional views, makes this area especially suitable for a small. Park on a trail loop (see notes on Sensitive Sites 4 and 74).
--Prairie restoration should approach presettlement conditions.
--See appendices for a list of expected prairie species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON NATURAL RESOURCE DISTRICT EVALUATIONS

District Name: Badger Mill Creek Slopes.

Map Key: 7

Sections: 33, 34, 35.

District Characteristics: Headwaters or part of several small branches of. Sugar River; farming, residential, city park; partly wooded.

Topography: Steep valleys and high ridges.
Geology: Ground moraine between the Milton and Johnstown end moraines; valleys partly filled with glacial outwash. Vegetation: Woods and prairies on slopes and outcrops; agriculture and some horticultural at residences.
Soils: Silt foams; deeper near valley bottoms, shallow on rims.
Hydrology: Drainage to Sugar River; some water retained in level, low spots.
Natural History: A variety of biotypes due to the varied topography; including wet meadows, dry prairie ridge-tops, and corridors of forest.
Scenic Beauty: Rural with a diversity of landscapes, including inspiring viewsheds.
Historic Importance: View points, vistas.
Most Important Natural Resources: Viewshed, scenic beauty; sustainable biotypes, species diversity; soil and water conservation.
Priority Land Use Objectives: Maintain greenway corridors; set performance standards to make residential development compatible with natural resources protection; also, protect town identity in this urban to rural transition zone.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: Badger Mill Creek Rims.

Map Key: P Resource District: 7

Quarter Sections: SE, & SW 27, SW, SE, NE & NW 35.

Sensitive Sites: 22, 23, 27, 53, 54, 58, & 76.

General Description: Head of small valley draining southward into Verona Township.

Biotypes: Oak forest and small wetland.

Watershed Characteristics: Setting--Steeply wooded slopes. Input Area--100 acres. Output--Badger Mill Creek to Sugar River.

Slopes: 20-60%

Soils: Dodge, Kidder, McHenry silt loams, erodible. Land Uses: Agricultural and developing residential.
Most Important Natural Resources: Groundwater recharge; priority agricultural soils; scenic beauty and natural farm features; open field and hedgerow habitat for wildlife.
Natural Resource Management Requirements: Control of erosion and improvement of water retention, filtration, and quality; oak regeneration and preservation of forest continuity; natural control of pest species; maintenance of, rural landscape character.
Priority Land Use Objectives: Sustainable agriculture; recreational open space; grassland and woodlot, wildlife conservancy; low-density and restricted cluster, residential development.
Means of Control: Transfer of development rights; overlay zoning in special resource management districts (especially for 'groundwater recharge insurance); public and private purchase of land and easements - formation of farm land trusts; conservation plans for all properties; and employment of a local conservation land steward.
Monitoring Requirements: a) Oak population (mature and sapling); b) continuity and connectivity of forest, forest edges, hedgerows and grasslands within environmental corridors; c) erosion and pollution (especially by chemicals); d) pest species populations; and e) abundance and diversity of native, and domesticated species (especially small mammals and birds).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 22 Elver West Oak Forest.

Map Key: 22 Resource District: 7 Critical Area: P

Quarter-Quarter Sections: SE/SW 35.

Total Acres: 20

Biotypes: Oak forest.

Aspect: East.

Slope: 30%

Important Functions and Values: a) life support for forest and forest edge species; b) soil and water conservation; c) educational and historic oak woods; and d) openings for oak regeneration.
Present Condition: Natural.
Preferred Uses: Park and recreational corridor.
Acceptable Uses: Large-lot residential, outside of forested slopes, with integrative native landscaping requirements based on resource performance standards; selective clustering at higher densities according to specific environmental standards that insure oak forest sustainability; erosion and stormwater remediation on all future subdivision plats; and restrictions on roads and buildings on slopes.
Means of Control: a) subdivision ordinances with review of Permits according to resource performance standards that include appropriate lot size, and setbacks; b) public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak population (mature and sapling), forest continuity and connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:
--Important viewshed from Raymond Road prairie (in NW/NE 2, in Verona Township).
--Opportunity for a trail link between this site and Morse Pond through to Elver Park.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 53 Elver South Oak Savanna.

Map Key: 53 Resource District: 7 Critical Area P

Quarter-Quarter Sections: SE/SE 35 (20 acres) & NE/SE 35 (10 acres).

Total Acres: 30

Biotypes: Rocky, thin-soil at prairie and savanna with associated woods.

Aspect: West and Southwest.

Slope: 20-60%

Important Functions and Values: a) life support for relic prairie, savanna and forest edge species; b) soil and water conservation; c) educational and historic settlement location; d) scenic beauty with outstanding vista and farm valley viewshed; e) --oak savanna, easily maintained due to micro-climatic conditions of droughty soil and west exposure, with openings for oak regeneration.

Present Condition: Natural, but with invasion of some weeds and brush.

Preferred Uses: Nature Park, scenic viewpoint, and low intensity, recreational corridor (trail view point).

Acceptable Uses: Large-lot residential, set back from slopes, with integrative native landscaping requirements based on resource performance standards, and special screening and control of erosion.

Means of Control: a) public and Private purchase of land and easements; b) subdivision ordinances with review of permits according to resource performance standards that include appropriate lot size and setbacks; and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.

Monitoring Requirements: a) pest species populations. b) erosion and pollution; c) oak population (mature and sapling), prairie continuity and connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).

Additional Notes and Sources of Information:

--Special management of this unique area will require cooperation from the City of Madison and Elver Park.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 23 Highpoint Midtown Oak Forest.

Map Key: 23 Resource District: 7 Critical Area P

Quarter-Quarter Sections: SW/SW 35.

Total Acres: 6

Biotypes: Oak forest.

Aspect: South.

Slope: 30%

Important Functions and Values: a) life support for forest and forest edge species; b) soil and water conservation; c) educational and historic oak woods; and d) = openings for oak regeneration.
Present Condition: Disturbed.
Preferred Uses: Conservancy as part of Elver West forest block.
Acceptable Uses: Large-lot residential, outside of forested slopes, with integrative native landscaping requirements based on resource performance standards; selective clustering at higher densities according to specific environmental standards that insure oak forest sustainability; erosion and stormwater remediation on all future subdivision plats; and restrictions on roads and buildings on slopes.
Means of Control: a) subdivision ordinances with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) pest species populations;-b) erosion and pollution; c) oak population (mature and sapling), forest continuity and connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:
--Connectivity of ecosystems is an important consideration here, along with the enhancement of open space.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 27 Gordon Oak Forest and Waterway.

Map Key: 27(a), 27(b) Resource District: 7 Critical Area P

Quarter-Quarter Sections: 27(a) NW/SE 34 (5 acres) & 27(h) SE/NE 34 (5 acres).

Total Acres: 10

Biotypes: Oak forest.

Slope: Flat.

Important Functions and Values: a) life support for forest and forest edge species; b) soil and, water conservation; c) openings for oak regeneration; and d) natural drainageway.
Present Condition: Disturbed, invasion by weeds and brush.
Preferred Uses: Sustainable agriculture with conservancy corridor for protection of waterway.
Acceptable Uses: Large-lot residential, outside of green waterway, with integrative native landscaping requirements based on resource performance standards; selective clustering at higher densities according to specific environmental standards that insure oak forest sustainability, erosion control, wetland restoration, and on-site stormwater remediation.
Means of Control: a) subdivision ordinances with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak population (mature and sapling), forest continuity and connectedness, and edge effects; and d) wetland plant and animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:
--This area requires further detailed inventory of species.
--A forest, waterway-pond, marsh, and sink complex could vastly improve the wildlife support system, especially for birds and amphibians, and ensure better water quality in the area.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 54 Highpoint Midtown Oak Savanna Restoration Site.

Map Key: 54 Resource District: 7 Critical Area: P

Quarter-Quarter Sections: SE/SW 35.

Total Acres: 20

Biotypes: Old field.

Aspect: Southeast.

Slope: 20%

Important Functions and Values: a) wildlife support; b) soil and water conservation; c) scenic beauty and historic geology; and d) recreation.
Present Condition: Fallow cropland with some residential.
Preferred Uses: Conservancy as marginal savanna and grassland with surrounding sustainable agriculture.
Acceptable Uses: Low-density residential with standards and guidelines in design for continuity of hedgerow corridors, scenic enhancement, grassland restoration, erosion control, and water quality improvement.
Means of Control: a) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of oak trees, marginal grasslands, slopes and natural drainageways; b) public or common private purchase of land and easements; and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) oak populations (mature and sapling); b) scenic and historic landscape elements; c) erosion and pollution; d) species abundance and diversity: (especially birds); e) grassland continuity and edge effects; f) pest species populations; and g) vandalism.
Additional Notes and Sources of Information:
--An opportunity exists here to link up with Elver Park and with Verona Township through a continuous natural corridor.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 58 Northeast Thirty-three Oak Savanna Restoration Site.

Map Key: 58 Resource District: 7 Critical Area: P

Quarter-Quarter Sections: SE/SW 27 (5 acres), SW/SW 27 (5 acres), SE/NE 33 (10 acres), & NE/NE 33 (10 acres).

Total Acres: 30

Biotypes: Homestead settlements with oaks.

Aspect: Southeast.

Slope: 20%

Important Functions and Values: a) wildlife support; b) soil and water conservation; c) scenic beauty and historic features; and d) domestic tranquility.
Present Condition: Partially residential.
Preferred Uses: Small reserves.
Acceptable Uses: Low-density residential with standards and guidelines in design for continuity of hedgerow corridors, scenic enhancement, oak savanna restoration, erosion control, and water quality improvement.
Means of Control: a) subdivision ordinances or plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks, protection of, oak trees, marginal grasslands, slopes and natural drainageways; b) public or common private purchase of land and easements; and c) education and, professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) oak populations (mature and sapling); b) scenic and historic landscape elements; c) erosion and pollution; d) species abundance and diversity (especially birds); e) grassland continuity and edge effects; f) pest species populations; and g) vandalism.
Additional Notes and Sources of Information:
--The potential exists for a natural corridor and trail from the Verona Block (Sensitive Site 26) to the Valley View East Oak Forest (Sensitive Site 76).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 76 Valley View East Oak Forest.

Map Key: 76 Resource District: 7 Critical Area P

Quarter-Quarter Sections: Center of SW 27, & SE/SW 27.

Total Acres: 25

Biotypes: Oaks and planted trees.

Aspect: Southeast.

Slope: 10%

Important Functions and Values: a) life support for forest and forest edge species; b) soil and water conservation; and c) scenic beauty and domestic tranquility.
Present Condition: Partially residential.
Preferred Uses: Large-lot residential according to standards.
Acceptable Uses: Large-lot residential and possible selective clustering at higher densities according to specific environmental standards that insure oak forest sustainability, with erosion and stormwater remediation on all plats; with integrative native landscaping requirements based on resource performance standards.
Means of Control: a) subdivision ordinances with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak population (mature and sapling), forest continuity and connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:
--Preservation and propagation of oak trees throughout is an important requirement for establishment of a rejuvenating local landscape character.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: Big Verona Block.

Map Key: 0 Resource District: 7

Quarter Sections: SW & NW 34.

Sensitive Sites: 26

Area Description: East-sloping, nearly continuous oak forest corridor, mostly south of the township.

General Characteristics: Rolling topography with forests of mix species in an alternating open and closed pattern, and having variable edge characteristics.

Biotypes: Oak forest and mixed.

Watershed Characteristics: Setting--West rim of Badger Mill Creek valley. Input Area--150 acres. Output--Badger Mill Creek to the Sugar River.

Slopes: 5-15%

Soils: Dodge and Kidder silt loams, erodible.
Land Uses: Natural.
Most Important Natural Resources: Important forest and animal habitat corridor connecting to a very large forest block (and Morse Pond) in Verona Township; soil conditions will remain stable if forest is managed Properly.
Natural Resource Management Requirements: Continuity, of forest corridor; oak regeneration; control of erosion and pest species; maintenance of natural infiltration for water quality.
Priority Land Use Objectives: Recreational, agricultural and low-density residential, with development according to resource performance standards.
Means of Control: Overlay zoning of forests in a special resource -management district; implementation and enforcement of erosion and water quality management requirements, including buffer zones especially at gullyheads.
Monitoring Requirements: a) Oak population (mature and sapling); b) continuity of forest and edge effects; c) erosion, pollution and vandalism; d) pest species Populations; and e) diversity and abundance of forest plants and animals (especially amphibians and birds).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUA JNS

Site Name: 26 Verona Block Oak Forest.

Map Key: 26 Resource District: 7 Critical Area: 0

Quarter-Quarter Sections: SE/NW 34 (10 acres), NW/SW 34 (20 acres), NE/SW 34 (10 acres), & SW/SW 34 (10 acres).

Total Acres: 50

Biotypes: Oak forest.

Slope: 10-20%

Important Functions and Values: a) life support for forest and forest edge species; b) soil and water conservation; c) openings for oak regeneration; and d) natural drainageways.
Present Condition: Natural, with disturbance.
Preferred Uses: Sustainable agriculture with emphasis on soil and water conservation.
Acceptable Uses: Recreational and low-density residential, with integrative native landscaping requirements based on resource performance standards; or selective clustering at higher densities at forest margins, according to specific environmental standards that insure oak forest sustainability, erosion control, and on-site stormwater remediation (that is, maximum infiltration).
Means of Control: a) subdivision ordinances and plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak population (mature and sapling), forest continuity, connectedness, and edge effects; and d) forest plant and animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:

--The leaders of the Township should hold meetings with representatives from Verona Township, the University of Wisconsin Golf Course, and the Ice Age Trail project to discuss how to integrate continuous environmental corridors, comprehensively in their plans.

--A more detailed biotic inventory of the forest system is needed.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 25 Applewood Oak Forest.

Map Key: 25 Resource District: 7, 8 Critical Area: Outlyer

Quarter-Quarter Sections: SE/SE 27.

Total Acres: 10

Biotypes: Oak forest.

Aspect: West and Southeast.

Slope: 20%

Important Functions and Values: a) life support for forest and forest edge species; b) soil and water conservation; c) openings for oak regeneration; and d) scenic beauty and domestic tranquility.
Present Condition: Residential.
Preferred Uses: Large-lot residential according to standards.
Acceptable Uses: Large-lot residential and possible selective clustering at higher densities according to specific environmental standards that insure oak forest sustainability, with erosion and stormwater remediation on all plats; with integrative native landscaping requirements based on resource performance standards.
Means of Control: a) subdivision ordinances and plat restrictions with review of permits according to resource' performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak population (mature and sapling), forest continuity and connectedness, and edge effects; and, d) animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:
--Septic problems invite tree root damage from construction unless regulations are enforced.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 41 Applewood Oak Savanna.

Map Key: 41 Resource District: 7, 8 Critical Area: Outlyer

Quarter-Quarter Sections: SW/SE 27 & SE/SE 27.
Total Acres: 25

Biotypes: Forest edge and fallow fields.

Aspect: West.

Slope: 0-10%

Important Functions and Values: a) life support for forest and forest edge species; b) soil and water conservation; c) openings for oak regeneration; and d) scenic beauty and domestic tranquility.
Present Condition: Residential.
Preferred Uses: Large-lot residential according to standards.
Acceptable Uses: Large-lot residential and possible selective clustering at higher densities according to specific environmental standards that insure oak forest sustainability, with erosion and stormwater remediation on all plats; with integrative native landscaping requirements based on resource performance standards.
Means of Control: a) subdivision ordinances and plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak population (mature and sapling), forest continuity and connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:
--Septic problems invite tree root damage from construction unless regulations are enforced.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 57 Applewood Oak Savanna Restoration Sites.

Map Key: 57 Resource District: 7, 8 Critical Area: Outlyers

Quarter-Quarter Sections: SW/SE 27 & NW/SE 27 (10 acres), NW/NE 34 (5 acres), & SW/SW 26 (5 acres).

Total Acres: 25

Biotypes: Savanna, forest edge and fallow fields.

Aspect: West, South and East.

Slope: 5-15%

Important Functions and Values: a) life support for forest and forest edge species; b) soil and water conservation; c) openings for oak regeneration; and d) scenic beauty and domestic tranquility.
Present Condition: Disturbed forest, old and fallow fields.
Preferred Uses: Conservation plans for residential with easements.
Acceptable Uses: Large-lot residential and possible selective clustering at higher densities according to specific environmental standards that insure oak savanna sustainability, with erosion and stormwater remediation on all plats; with integrative native landscaping requirements based on resource performance standards.
Means of Control: a) subdivision ordinances and plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) Public or common private Purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) oak population (mature and sapling), savanna and grassland continuity and connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:
--An effort should be made to blend natural landscape elements and connect biotypes in this area.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON NATURAL RESOURCE DISTRICT EVALUATIONS

District Name: Central Basin.

Map Key: 8

Sections: 16, 17, 21, 22, & 27.

District Characteristics: A large, central, open, and rolling agricultural (working) landscape with a conspicuous, internally drained flat.

Topography: Shallow valley heads in the steeper sandstone rims converge upon several internally drained sub-basins; elevations are 1000-1100 feet.

Geology: Ground moraine over dolomite.

Vegetation: Now mostly cropland; some smaller woods and prairie relics at rims and near some homesteads.

Soils: Silt loams; deeper in basin (river bottom), shallow on rims.

Hydrology: Important infiltration field; little runoff and intermittent streambeds imply internal drainage--this is a valuable groundwater recharge area with frequent sinks and even caves (though now filled with rubble, historic record_ show caves in the area) that provide direct routes for surface water flow into openings in the sedimentary bedrock.

Natural History: The landscape was formerly made up of oak forests, oak savannas, prairies, wet prairie pot holes and riparian wetlands.

Scenic Beauty: Rural working landscape; farmhouses, barns, woodlots, pastures and cornfields.

Historic Importance: Natural drainageways, restorable prairies, and early settlement landscape; now University Experimental Farms and several historic settlements.

Most Important Natural Resources: Native prairie and grassland as habitat for wildlife and as a necessary element of the natural system to ensure groundwater protection (the design of open green space should depend firstly on surface and groundwater resource requirements throughout the Town); sustainable working landscape centered on the constructive use of prime agriculture soils; scenic beauty and historic landmarks; educational and recreational opportunities overall.

Priority Land Use Objectives: Sustainable, working agricultural landscape with special attention given to research and urban fringe garden plats, and to soil and groundwater conservation; prairie restoration; education. It is especially important that the natural topography and landforms be protected throughout all natural areas in the Town, but it is even critical that development sites not be artificially re-graded within basins that are internally drained.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: Internally Drained Areas.

Map Key: T Resource District: 8

Quarter Sections: SW, SE, NE, & NW 16, SE 17, NE 20, SW, SE, NE, & NW 21, & SE & SW 22.

Sensitive Sites: 4, 9, 11, 37, 38, 74, & 89.

General Description: Rolling moraine landscape with many central, internally drained, level areas.

Biotypes: Mostly agricultural with some small forests and savannas.

Watershed Characteristics: Setting--Rolling with no surface outlets. Input Area--100 acres. Output--Evaportranspiration and groundwater recharge.

Slopes: Out to rims 0-20%.

Soils: Prime agricultural soils; silt loams.
Land Uses: Agricultural, including UW Experimental Farm, and a few small residential areas.
Most Important Natural Resources: Groundwater recharge; agricultural soils with low erodibility; scenic open space; grassland for wildlife life support.
Natural Resource Management Requirements: Maintain open spaces with soils in sustainable productivity, but with greater care in the use of agricultural pollutants (and introduce new agricultural economies); reserve certain peripheral areas for natural resources and for residential development on the more marginal soils, but not on steep slopes; restore and manage oak forest and savanna biotypes where feasible.
Priority Land Use Objectives: Sustainable agricultural; groundwater recharge; low-density residential or clustering according to specific environmental standards.
Means of Control: Overlay zoning, subdivision ordinances, and ¯plat restrictions for agricultural and $_{water}$ recharge areas, based on resource performance standards, with strong requirements which recognize the need for a sustainable agricultural economy and unpolluted groundwater; recognize the need for a healthy mixture of agricultural use, reserve land, and low-density residential, especially in the center flats.
Monitoring Requirements: a) erosion, and pollution of both surface and groundwater; b) oak population (mature and sapling); c) percentage of area that remains unbuilt; d) potential new ways to make agriculture economically sound; e) pest species populations; and f) grassland wildlife abundance and diversity (especially birds).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 4 Schewe Oak Forest.

Map Key: 4 Resource District: 8 Critical Area: T

Quarter-Quarter Sections: NE/NE 20 & SE/NE 20.

Total Acres: 6.

Biotypes: Oak forest.

Slope: 3%

Important Functions and Values: a) life support for forest and forest edge species; b) soil and water conservation; c) openings for, oak regeneration; and d) scenic beauty and domestic tranquility.
Present Condition: Agricultural related or residential.
Preferred Uses: Sustainable agriculture with very large-lot residential according to standards (farmets).
Acceptable Uses: Large-lot residential and possible selective clustering at higher densities according to specific environmental standards that insure the economic sustainability of open surrounding farmland, with erosion and stormwater remediation on all plats; and with integrative native landscaping requirements based on resource performance standards.
Means of Control: a) subdivision ordinances and plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land (or easements or farmland trusts); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) pest species populations; b) erosion, and pollution of both surface and groundwater; c) infiltration flats and marginal grasslands for continuity, connectedness, and edge effects; and d) animal species abundance and diversity (especially birds and small mammals).
Additional Notes and Sources of Information:

--Life support could be enhanced by connecting fencerow from Highway S northward to Sensitive Site 9 (Fencerow Oak Forest).

--A further biotic inventory is needed to define potential wildlife habitats that might be restored.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 9 Fencerow Oak Forest.

Map Key: 9 Resource District: 8 Critical Area: T

Quarter-Quarter Sections: NE/SE 17 & SE/SW 17.

Total Acres: 15

Biotypes: Oaks in three places (including north-south fencerow down center of SE 17).

Aspect: Various.

Slope: 0-10%

Important Functions and Values: a) life support for forest and forest edge species; b) soil and water conservation; c) some possibility for oak regeneration; and d) one of few remaining rock-wall fence rows left in the Town (the large granite boulders, originally removed from the fields and placed at hedgerows are now being sold for city landscaping- this rural amenity is thereby, sadly being lost); and e) scenic beauty and domestic tranquility.

Present Condition: Not inventoried in detail, but seeming to be generally quite diverse.

Preferred Uses: Connecting greenstrip.

Acceptable Uses: Sustainable Agriculture with preservation of hedges, or low-density residential according to specific environmental standards.

Means of Control: a) subdivision ordinances and plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land (or easements or farmland trusts); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.

Monitoring Requirements: a) pest species populations; b) erosion, and pollution of both surface and groundwater; c) infiltration flats and marginal grasslands for continuity, connectedness, and edge effects; and d) animal species abundance and diversity (especially birds and small mammals).

Additional Notes and Sources of Information:

--This would make a nice foot trail link from ski jump area to west end of Elderberry Road via Sensitive Sites 4, Schewe Oak Forest, and 16, Elderberry Oak Forest (see further notes under Sensitive Sites 4, 16, and 74).

--A more detailed biotic inventory will be needed.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 11 South University Farms Forest.

Map Key: 11 Resource District: 8 Critical Area: T

Quarter-Quarter Sections: SE/NW 27.

Total Acres: 5

Biotypes: Oak woodland, with some adjacent tree plantings.

Aspect: Northeast.

Slope: 20%

Important Functions and Values: a) life support for forest and forest edge species; b) soil and water conservation; c) some possibility for forest improvement; and e) scenic beauty and domestic tranquility.
Present Condition: Disturbed.
Preferred Uses: Sustainable Agriculture with preservation of oak trees.
Acceptable Uses: Homesite with an appropriate soil and water conservation plan, and oak preservation.
Means of Control: a) plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks; and b) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) pest species populations; b) erosion, and pollution of both surface and groundwater; c) populations of oaks (mature and sapling) and d) animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:
--Protection of oaks should be an important aspect of the plan throughout.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 37 Blackhawk Homestead Savanna.

Map Key: 37 Resource District: 8 Critical Area: T

Quarter-Quarter Sections: SE/NW 16.

Total Acres: 5

Biotypes: Oak savanna.

Aspect: Slight, southeast.

Slope: 2%

Important Functions and Values: a) life support for savanna and grassland species; b) soil and water conservation; c) some ,possibility for oak regeneration; and e) scenic beauty, historic landmarks, and domestic tranquility.

Present Condition: Somewhat disturbed.

Preferred Uses: Associated sustainable agriculture.

Acceptable Uses: Large-lot residential according to specific environmental standards that insure the economic sustainability of open surrounding farmland, with erosion and stormwater remediation on all plats; and with integrative native landscaping requirements based on resource performance standards.

Means of Control: a) subdivision ordinances and plat restrictions with review of permits according to resource performance standards that include appropriate lot size arid' setbacks; b) public or common private purchase of land (or easements or farmland trusts); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.

Monitoring Requirements: a) pest species populations; b) erosion, and pollution of both surface and groundwater; c) infiltration areas and savanna for continuity, connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).

Additional Notes and Sources of Information:

--Just one example of the potential to maintain both a homestead and a piece of oak savanna by a combination of lawn mowing and natural landscaping practices.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 38 Middleton Junction Savanna.

Map Key: 38 Resource District: 8 Critical Area: T

Quarter-Quarter Sections: SW/SE 32 & SE/SE 32.

Total Acres: 20

Biotypes: Oak savanna, in cemetery and homesteads.

Slope: flat

Important Functions and Values: a) life support for savanna and grassland species; b) soil and water conservation; c) some possibility for oak regeneration; and e) scenic beauty, historic landmarks, and domestic tranquility.

Present Condition: Could easily be improved, some parts already well suited to savanna.

Preferred Uses: Natural historic site.

Acceptable Uses: Large-lot residential around cemetery; according to specific environmental standards that preserve the historic features and insure the economic sustainability of open surrounding farmland, with erosion and stormwater remediation on all plats; and with integrative native landscaping requirements based on resource performance standards.

Means of Control: a) subdivision ordinances and plat restrictions with review of permits according to resource performance standards that include appropriate lot size and setbacks; b) public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.

Monitoring Requirements: a) pest-species populations; b) erosion, and pollution of both surface and groundwater; c) infiltration areas and savanna for continuity, connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).

Additional Notes and Sources of Information:

--Historic marker is present.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 74 Old Sauk West. Forest.

Map Key: 74 Resource District: 8 Critical Area: T

Quarter-Quarter Sections: SE/SW 16, NE/NW 21, & SW/NW 21.

Total Acres: 30

Biotypes: Oak forest, savanna, and plantings including north-south fencerow down center of NE'21).

Aspect: Various mostly flat.

Slope: 0-10%

Important Functions and Values: a) life support for savanna and grassland species; b) soil and water conservation; c) some possibility for oak regeneration; and e) scenic beauty, historic landmarks, and domestic tranquility.
Present Condition: Mostly residential.
Preferred Uses: Reserve with buffers on forest and fencerow.
Acceptable Uses: Maintain present residential density but curb development down fencerows; reinforce with integrative native landscaping requirements based on resource performance standards.
Mears of Control: a) subdivision ordinances and plat restrictions with review of permits according to resource performance standards that include conservation of soil and water, and appropriate lot size and setbacks; b) public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping.
Monitoring Requirements: a) pest species populations; b) erosion, and pollution of both surface and groundwater; c) infiltration areas and savanna for continuity, connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:

--An unusually wide fencerow south to Elderberry Road would make a wonderful foot or horse trail, looping back on Schewe Road (see notes on Sensitive Sites 4 and 9). Residences should be clustered as at present to protect open fields (see note on Sensitive Site 81).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 89 Old Sauk Wet Forest Restoration Site.

Map Key: 89 Resource District: 8 Critical Area: T

Quarter-Quarter Sections: SW/SW 16.

Total Acres: 3

Biotypes: A small, low spot suitable for wet forest restoration.

Slope: Basin.

Important Functions and Values: a) research in wet forest restoration; b) soil and water conservation.
Present Condition: Disturbed.
Preferred Uses: Wetland conservancy.
Acceptable Uses: Large-lot residential according to specific environmental standards, with appropriate setbacks.
Means of Control: a) subdivision ordinance or plat restriction with resource performance standards.
Monitoring Requirements: a) pest species populations; b) erosion and pollution; c) tree species; and d) water levels.
Additional Notes and Sources of Information:

--This site and Sensitive Sites 60 and 27 need to be further inventoried to decide on best biotype and management practices; all three may have sinks.

--Plat restrictions for sinks are needed to assure groundwater quality.--See appendices for expected species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON NATURAL RESOURCE DISTRICT EVALUATIONS

District Name: South Fork Pheasant Branch Creek Countryside.

Map Key: 9

Sections: 10, 15, 16, 22, 26, & 27.

District Characteristics: Open land and forest; some commercial and residential development.

Topography: East slopes; 1000-1100 foot elevation.
Geology: Ground moraine on the east side of the Milton terminal moraine.
Vegetation: Woodlots, fields, in natural drainageways to Pheasant Branch Creek and right-of-ways throughout.
Soils: Silt loams.
Hydrology: West side of Yahara Basin with drainage east and north through Pheasant Branch Creek.
Natural History: An area of forests and savannas, now mostly in cropland or developing at urban fringe; existing woodlots, fencerows, and potential greenways remain, however, and can enable the natural biota to persist.
Scenic Beauty: A key point to the viewshed, east.
Historic Importance: Early settlements (on edge of Resource District 8) and historic vista.
Most Important Natural Resources: Scenic beauty of the natural viewshed, east to the State Capital; prime soils for sustainable agriculture; important natural surface drainageway; biotype and species diversity; soil and water conservation; and open space for maintaining the Town's identity.
Priority Land Use Objectives: Protect the scenic vista and viewshed; maintain the natural greenway corridor to make residential development compatible with natural resources requirements, thus preserving Town identity throughout the urban transition zone, and allowing for rural access into the city along environmental corridors.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON CRITICAL NATURAL AREAS EVALUATIONS

Area Name: Historic Church.

Map Key: Q Resource District: 9

Quarter Sections: SW, SE, & NW 15, SE 16 & NW 22.

Sensitive Sites: 13, 14, 15, 35, 51, 60, & 75.

General Description: Hilltop with historic and scenic features; the location contains both cultural and natural elements of special quality.

Biotypes: Oak forest and savanna (restoration site).

Watershed Characteristics: Setting--Northeast edge of recessional moraine at the west edge of the City of Madison. Input Area--100 acres. Output--South Fork of Pheasant Branch Creek.

Slopes: 0-20%

Soils: Silt loams.

Land Uses: Historic church and cemetery; residential (including Frank Lloyd Wright-designed home); agricultural; utilities; industrial park.

Most Important Natural Resources: Wildlife support; scenic beauty, historic landmarks, and domestic tranquility; urban-rural interface; Township identity; and new types of sustainable agriculture.

Natural Resource Management Requirements: Maintenance of forests, savannas, grasslands, and rights-of-way for oak regeneration; naturalized landscaping; soil and water conservation.

Priority Land Use Objectives: Historic site preservation, accompanied by low-density residential, according to specific environmental standards.

Means of Control: a) subdivision ordinances and plat restrictions with review of permits according to resource performance standards that include conservation of soil and water, and appropriate lot size and setbacks; b) public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping; and e) Plan cooperation between the Town, and the Cities of Madison and Middleton.

Monitoring Requirements: a) pest species populations; b) erosion, and pollution of both surface and groundwater; c) infiltration areas and savanna for continuity, connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 13 West South Fork Pheasant Branch Creek Forest.

Map Key: 13 Resource District: 9 Critical Area: Q

Quarter-Quarter Sections: NE/SE 16.

Total Acres: 6

Biotypes: Oak forest.

Aspect: Slight, East.

Slope: 2%

Important Functions and Values: a) life support for savanna and, grassland species; b) soil and water conservation in the water system; c) some possibility for oak regeneration; and e) scenic beauty, and domestic tranquility.
Present Condition: Disturbed.
Preferred Uses: Reserve node in part of waterway.
Acceptable Uses: Low-density residential around area on outside, according to resource performance standards, with drainageway buffer zone.
Means of Control: a) subdivision ordinances and plat restrictions with review of permits according to resource performance standards that include conservation of soil and water, and appropriate lot size and setbacks; b) public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping; and e) Plan cooperation between the Town, and the Cities of Madison and Middleton.
Monitoring Requirements: a) pest species populations; b) erosion, and pollution of both surface and groundwater; c) infiltration areas and forests for regeneration, continuity, connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:
--Compare with Sensitive Site 14, as a low waterway site and also part of church viewshed.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 14 Northwest Church Forest.

Map Key: 14 Resource District: 9 Critical Area: Q

Quarter-Quarter Sections: SW/SW 15.

Total Acres: 9

Biotypes: Oak forest.

Aspect: Slight, Northeast.

Slope: 10%

Important Functions and Values: a)wildlife support; b) soil and water conservation; and c) education, passive recreation, scenic beauty, historic landmarks, and domestic tranquility.
Present Condition: Could easily be improved.
Preferred Uses: Nature Park or reserve.
Acceptable Uses: Low-density or cluster residential, according specific environmental standards, at exterior of location and screened from view, especially on west and east sides.
Means of Control: a) subdivision ordinances and plat restrictions with review of permits according to resource performance standards that include conservation of soil and water, and appropriate lot size and setbacks; b) public or common private purchase of land (or easements); and c) education and professional advice about single lot and neighborhood conservation plans that include integrative native landscaping; and e) Plan cooperation between the Town, and the Cities of Madison and Middleton.
Monitoring Requirements: a) pest species populations; b) erosion, and pollution of both surface and groundwater; c) infiltration areas and forests for regeneration, continuity, connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:
--This site is in the viewshed of church; it is the nearest oak forest to the church and the only sizable woodland in Resource District 9.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 15 Industrial Park Forest.

Map Key: 15 Resource District: 9 Critical Area: Q

Quarter-Quarter Sections: SW/SE 15.

Total Acres: 10

Biotypes: Oak forest.

Aspect: North.

Slope: 5%

Important Functions and Values: a) wildlife support; b) soil and -water conservation; and c) education passive recreation, scenic beauty, historic landmarks, and domestic tranquility.
Present Condition: Could easily be improved.
Preferred Uses: Nature Park or reserve.
Acceptable Uses: Public park.
Means of Control: a) public or common private purchase of land (or easements); and, d) education, and professional advice about single oak regeneration and conservation planning.
Monitoring Requirements: a) pest species populations; b) erosion, and pollution of both surface and groundwater, and vandalism; c) infiltration areas and forest for regeneration, continuity, connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:
--Now in City of Madison industrial park, but is part of historic area viewshed; demonstrates how light industry can maintain natural features and resources with good planning, design, and management.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 35 Cemetery Savanna.

Map Key: 35 Resource District: 9 Critical Area: Q

Quarter-Quarter Sections: NE/SW 15.

Total Acres: 10

Biotypes: Oak forest.

Slope: Flat.

Important Functions and Values: a)wildlife support; b) soil and water conservation; and c) education, passive recreation, scenic beauty, historic landmarks, and domestic tranquility.
Present Condition: Could easily be improved.
Preferred Uses: Nature Park or reserve.
Acceptable Uses: Public park.
Means of Control: a) public or common private purchase of land (or easements); and d) education and professional advice about single oak regeneration and conservation planning of savanna around cemetery.
Monitoring Requirements: a) pest species populations; b) erosion, and pollution of both surface and groundwater, and vandalism; c) infiltration areas and forest for regeneration, continuity, connectedness, and edge effects; and d) animal species abundance and diversity (especially birds).
Additional Notes and Sources of Information:
--Savanna and forest is larger than cemetery and offers the opportunity for a small park on a trail.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 51 North Church Oak Savanna Restoration Sites.

Map Key: 51 Resource District: 9 Critical Area: Q

Quarter-Quarter Sections: SW/NW 15 (5 acres), & NW/SW 15 (5 acres).

Total Acres: 10

Biotypes: Homestead with savanna restoration potential.

Aspect: East.

Slope: 10%

Important Functions and Values: a) wildlife support; b) soil, and water conservation; and c) education, passive recreation, scenic beauty, historic landmarks, and domestic tranquility.
Present Condition: Disturbed.
Preferred Uses: Park, reserve, or nature interpretive center.
Acceptable Uses: Compatible residential use according to specific environmental standards.
Means of Control: a) Special conservation plan contact with owner; and b) savanna management plan for area surrounding cemetery.
Monitoring Requirements: a) pest species populations; b) erosion; c) oak regeneration (mature and sapling); and D) viewshed.
Additional Notes and Sources of Information:
--Potential sites for historic development (see Sensitive Site 60).

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 60 South Church Oak Savanna Restoration Sites.

Map Key: 60 Resource District: 9 Critical Area: Q

Quarter-Quarter Sections: NW/NW 22.

Total Acres: 10

Biotypes: Homestead with savanna potential.

Aspect: East.

Slope: Slight, 2%

Important Functions and Values: a) wildlife support; b) soil and water conservation; and c) education, passive recreation, scenic beauty, historic landmarks, and domestic tranquility.
Present Condition: Easily improved.
Preferred Uses: Park, reserve, or interpretive cultural center.
Acceptable Uses: Compatible residential use according to specific environmental standards.
Means of Control: a) Special conservation plan contact with owner; and b) savanna management plan for area surrounding cemetery.
Monitoring Requirement: a) pest species populations; b) erosion; c) oak regeneration (mature and sapling); and d) viewshed.
Additional Notes and Sources of Information:
--This is another potential site for historic preservation.
--See appendices for expected species.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 75 Old Sauk East Oak Forest.

Map Key: 75 Resource District: 9 Critical Area: Q

Quarter-Quarter Sections: NE/NW 22.

Total Acres: 10

Biotypes: Oak forest along with planted trees

Aspect: East.

Slope: 15%

Important Functions and Values: a) wildlife support; b) soil and water conservation; and c) education, passive recreation, scenic beauty historic landmarks, and domestic tranquility.
Present Condition: Disturbed.
Preferred Uses: Low-density or cluster residential, according to specific environmental standards.
Acceptable Uses: Same.
Means of Control: a) Special conservation plan contact with owner; and b) savanna management plan for area surrounding cemetery.
Monitoring Requirements: a) pest species populations; b) erosion; c) oak regeneration (mature and sapling); and viewshed.
Monitoring Requirements: a) pest species populations; b) erosion; c) oak regeneration (mature and sapling).
Additional Notes and Sources of Information:
--This site includes the Frank Lloyd Wright-designed, Jacobs II home.

(Zimmerman & Kailing, 1990)

TOWN OF MIDDLETON SENSITIVE NATURAL SITE EVALUATIONS

Site Name: 21 Highpoint Oak Forest.

Map Key: 21 Resource District: 9 Critical Area: Outlyer

Quarter-Quarter Sections: NE/SW 26.

Total Acres: 10

Biotypes: Oak forest along with planted trees.

Aspect: North, Northwest.

Slope: Slight, 2%

Important Functions and Values: a)wildlife support; b) soil and water conservation; and c) education, passive recreation, scenic beauty, historic landmarks, and domestic tranquility.
Present Condition: Could easily be improved.
Preferred Uses: Nature Park or reserve.
Acceptable Uses: Low-density or cluster residential, according to specific environmental standards, at exterior of location and screened from view.
Means of Control: Cooperative planning with the City of Madison.
Monitoring Requirements: a) pest species populations; b) erosion and vandalism; and c) oak regeneration (mature and sapling).
Additional Notes and Sources of Information:
--Like Sensitive Sites 12, 15, 22, 35, 53, and 75, this site is in, or close to, an annexed urban area but deserves cooperative protection and management as a shared amenity.

(Zimmerman & Kailing, 1990)

CHAPTER 6 CONSERVATION LAND USE PLANNING ALTERNATIVES

Effective conservation requires two key elements: (1) knowing (personally experiencing the workings of nature--the land, the landscape, the flora and fauna), and (2) caring (taking personal responsibility for seeing that the natural systems are sustained). The problem with current practices and institutions is their inability to foster the need for these key elements within the citizenry. Centralized regulatory authority, in fact, removes both the knowing and caring from the layman. Furthermore, regulations on land use fail to focus on the ecosystem at any scale, turning their attention to separate individual parcels instead. In addition, once such regulations are in place there is no monitoring of how well the system is working.

There is, however, a new direction in conservation that offer opportunities for landowners and the community in land use planning. We suggest six approaches that, if pursued simultaneously, may empower a sufficient number• of citizens to direct the institutional framework in ways that will keep the natural ecosystems healthy and self-sustaining.

1. EDUCATION AND INFORMATION (promoting knowing and caring directly with Township residents).
   --Locate resource persons in or near the Township: teachers, naturalists, gardeners; University of Wisconsin faculty/staff, amateurs, sports/recreation people.
   --Set up periodic workshops in each of the natural resource districts.
   --Encourage informational workshops for landowners and neighborhood groups in order to: (a) advise them of the natural resources they have on their land-- their assets and the potential to restore/regain lost resources, (b) offer proper management strategies for resource maintenance and/or restoration.
   --Work with the schools and the school board to assure that ecological field experience at all grade levels is part of the curriculum (a new legislative mandate, signed by the governor, endorses such program funding).
   --Establish a monitoring program at key sites for key species and factors such as erosion, stream flow, pest control, groundwater. Involve both students, teachers, and property owners in maintaining this as a permanent study and recording program.
   --This consulting team would be willing, upon your request, to help establish a pilot workshop or school program.

2. TOWN PLANNING INITIATIVES
   Towns in the Midwest enjoy less local control and, therefore, less citizen participation than other parts of the country, such as New England. Town planning initiatives can be pursued to address Town powers in two distinct areas:

(Zimmerman & Kailing, 1990)

-- Land use regulation based on sustainable ecosystem requirements including large, performance based management units rather than individual parcels. The Town's Environmental Assessment Checklist is a good start in this direction.

-- A discussion among all parties is needed to equalize the powers and rights of rural governments and their planning bodies with those of urban cities and their extraterritorial rights. Both land use planning and full economic implications should be major points in such discussions.

3. ALTERNATIVE PLANNING AND ZONING STRATEGIES

Planning and zoning for the Town should be based on performance standards grounded in sound biological criteria. Examples of these alternative means of maintaining natural system health within the context of human use include: land banking, transferrable development rights, conservation reserves and special conservation districts.

4. PRIVATE LAND CONSERVATION

--The Dane County Natural Heritage Fund, a land grant trust, is an important tool for conserving natural resources. It has the ability to negotiate for conservation easements with land owners who would then receive certain tax benefits while still maintaining prior use of the property. The DCNHF is like The Nature Conservancy and supplements its work with a wide variety of projects, such as agricultural preservation easements.

--A second tool is the new Wisconsin Stewardship Fund. It can cost-share land trust purchases of easements without requiring unrestricted public access. The first round of applications must be submitted to the Wisconsin Department of Natural Resources by November 1990.

5. AGENCY COOPERATION IN LOCAL RESOURCE PLANNING

The public agencies involved in public land conservation will be most cooperative when they have conspicuous roles to play in conservation initiatives. These roles include designation, acquisition, and development.

--Designation: We have focused on the Ice Age Trail as a linear corridor but we have not really mentioned what can be seen from it. The glacier-carved Black Earth Creek Gateway and Glacial Lake Middleton deserve national recognition as a unique historic and natural landmark. The National Park Service should be approached for designation (and possible land acquisition).

--Public Land Acquisition: The Township can avail itself of Wisconsin's Stewardship Fund with or without the assistance of a land trust. The Regional Planning Commission, Wisconsin DNR, and Dane County can be approached by the Town Parks Commission with an acquisition package. They can ask for financial and planning assistance, especially after pursuing national designation.

(Zimmerman & Kailing, 1990)

-- Conservation Development: Wetland restoration can employ both state (DNR) and federal (U.S. Fish and Wildlife Service) assistance on private as well as public lands along Black Earth Creek. Sinks also need special attention and can receive it from U.S. Geological Survey and Soil Conservation- Service. Conservation Reserve Program contracts can be encouraged in appropriate areas pending later sustainable agricultural projects. Scenic easements can be pursued with Wisconsin Department of Transportation as well as with the Dane County Highway Department. Highway design and utility coordination are essential to protect roadside trees and vegetation, requiring initiatives with both highway departments and WPSC.

7. LEGISLATIVE ACTION

There are currently two major. state and/or regional planning issues that the Town should let their representatives know are important to the 'Township's well-being.

-- The state statutes, in general, fail to address environmental issues as they concern planning. Sound biological standards need to be developed and put in place to assure a more comprehensive, ecosystem7oriented approach is taken.

-- There is an urgent need to revise annexation laws and establish a greater sense of jurisdictional responsibility (care) for the landscape. This is especially true for rural communities faced with the loss of land under the claim of urban extraterritorial "rights".

While the Town should vigorously pursue the above points, it should also put considerable effort into employing on a part-time basis, a local resident who is trained and experienced in natural ecosystems to help initiate, plan and coordinate the planning initiatives it decides upon. We v\believe that initial funding for such a position is very possible via a five-year grant. After five years the position should justify Town financing by demonstrating benefits both in conservation and in the budget. In addition, there is also the possibility that a University graduate student instructional project could be begun to help support the initiatives we have outlined.

(Zimmerman & Kailing, 1990)

CHAPTER 7 GLOSSARY

ADAPTATION:
Genetically determined characteristic (behavioral, morphological, and physiological) that improves an organism's ability to survive and successfully reproduce under prevailing environmental conditions.

ASSOCIATION:
A natural unit of vegetation characterized by relatively uniform species composition and often dominated by a particular (indicator) species.

BIOTYPE:
A specified regional association of mostly endemic plants and animals together with their physical foundations and connections; it is a community of associated yet diverse, indigenous species that are adapted to a particular set of environmental conditions; each is also an ecosystem; some examples in Middleton are oak savannas, southern lowland forests, southern mesic forests, wet prairies, sedge meadows, carrs, dry (goat) prairies, and cattail marshes. Specific biotypes along with larger ecosystems as forests, grasslands, and wetlands help distinguish the landscape units at each of the three levels. Special biotic features such as hedgerows are also important.

CARRS:
Shrub swamps, especially on peaty soils.

COMMUNITY:
A group of interacting plants and animals inhabiting a given area.

CONSERVATION BIOLOGY:
Is the biology of scarcity; involves understanding the dynamics of natural ecosystems, and the means by which they might be preserved and incorporated in plans, given the exploitive pressures of society.

CRITICAL NATURAL AREAS:
An intermediate mapped landscape unit, smaller than the Natural Resource District, which provides an intermediate classification for the grouping Sensitive Natural Sites, and also broader elements of the resource base, such as groundwater recharge areas, open space, and agricultural lands, to emphasize larger ecological systems which function best when their components are properly maintained. The landscape unit classification allows for broad conservation policies, not limited to the Resource Districts, but still too general to be applied to the Sensitive Sites.

DOMINANT:
Population showing ecological primacy in a given community and thereby governing the type and abundance of neighboring species.

DIVERSITY:
Abundance in number of species in a given location. Also, variety of landscape patterns.

(Zimmerman & Kailing, 1990)

ECOLOGY:
The study of the interrelations between living organisms and their environment.

ECOSYSTEM:
A system wherein living organisms and their nonliving (abiotic) environment are inseparably interrelated and interact in selectively predetermined and thereby economically efficient ways.

ECOSYSTEM FUNCTIONS:
Services of natural ecosystems upon which the resource base is predicated.
Some of these are:

Life Support: As habitat (also for people) that provides living space, shelter, food, water, and satisfies reproductive needs.

Soil Conservation: Soil stability and renewal.

Water Quality: Purification through natural cycles and biotic systems; physical recharge and storage.

Water Retention: As required for plants and animals; in organic materials; as flood prevention.

Gene Bank: Maintenance of a diversity of native species, including rare or endangered plants and animals.

Restoration Potential: Providing a base for the replacement of lost biotypes.

Regeneration: Providing the base for sustained natural reproduction and replacement of individuals in populations.

Scenic Beauty: Expressed in the diversity and balance of natural topography, biotypes, traditional land uses, and the absence of blight.

Human Amenities: Recreational; cultural (historic, scientific, educational); comfort (comfortable microclimates, as with shading and shelter from wind). .

ECOTONE:
Transition zone between two structurally different communities; the edge or marginal gradient.

EDAPHIC:
Relating to soil.

ENDEMIC:
Restricted to a given region.

(Zimmerman & Kailing, 1990)

ENVIRONMENT:
The total surroundings of an organism including other plants and animals, and species of its own kind, and also all interrelated physical elements.

EVOLUTION:
Change in gene frequency through time resulting from natural selection and producing cumulative changes in the characteristics of a population of plants or animals.

FEN:
Wetland dominated by sedges where peat accumulates.

FORBS: Broad-leaved grassland plant species as opposed to grasses.
FORESTS: Landscape dominated by trees, about 80 trees per acre, with natural vegetation at the ground layer (herbs) and midstory (shrubs and saplings) levels.

Oak forests: Dominated by four oak species and hickory; includes cherry and aspen.

Mixed forests: Oak forests with additional species such as Basswood, White Birch, Ironwood, Butternut, Slippery Elm, and Walnut.

Floodplain forests: Flood-tolerant woodlands characterized by American elm, silver maple, green ash, hackberry, swamp white oak, willow, cottonwood, and Boxelder in moist, fertile soils.

GRASSLANDS (important wildlife habitat):
Landscape dominated by large expanses of primarily grass, often over 40 acres; including hayfields, pastures, peatlands, and native prairies; suitable as animal breeding areas (especially for birds).

HABITAT (home):
Place where a plant or animal lives.

HETEROGENEOUS LANDSCAPE:
Not regular, consisting of diverse landscape patterns and dissimilar (but usually balanced) ecological elements throughout,

IMPACTS OF LAND USE:
Effects produced by human actions which degrade ecosystems and ate destructive to the landscape as a whole. Some examples include:

Erosion: Soil loss because of soil compaction; loss of leaf litter layer and vegetation; surface water runoff loading due to increased hard surfaces (roofs, driveways, parking lots) especially in areas near waterways and gullyheads.

Species loss: Absence of previously flourishing animal or plant species due to loss or deterioration of natural habitat; or loss due to inability to compete with alien species,

(Zimmerman & Kailing, 1990)

LAND ETHIC:
A self-imposed limitation on the degree to which one will modify or destroy the landscape, or exploit the resource base; in agreement with sustainable use and constructive stewardship.

LANDFORM:
A geomorphic feature of the earth's surface.

LANDSCAPE:
A heterogeneous land area, of varying size and shape depending on geomorphology, climate, biology, and human use, and composed of interacting ecosystems that are usually repeated.

Natural Landscapes: Showing little or no human alteration of land forms, topography, water, soil, vegetation, scenery, or other natural elements,

Working Landscape: Showing agricultural or other production-oriented interactions with the land in harmony with nature, often lending a special scenic quality, and allowing for ecosystem continuity, integrity, and resource sustainability.

Blighted Landscape: Land areas where intrusive use has interrupted or destroyed the part or all of the natural resource base, often by total displacement of natural ecosystems. Examples are quarries, landfills, insensitive grading for developments, massive structures such as roadways and parking lots.

LANDSCAPE ECOLOGY:
A study of the structure, functions, and change in a heterogeneous land area composed of interacting ecosystems.

LANDSCAPE UNIT:
Architecturally defined land management district, or conservation zone, delineated on the bases of broad resource planning goals and objectives (such as protection of natural hydrologic systems), and the biotic constituency, ecological functions provided, and requirements for resource sustainability; the three categories are Natural Resource Districts, Critical Natural Areas, and Sensitive Natural Sites.

MANAGEMENT POLICIES:
Those activities designed to manage, or restore and maintain a given ecosystem and its functions; or the special actions required to enhance the resource base and improve special landscape features.

Maintenance: Actions taken to insure no net loss in either the quality or quantity of ecosystem functions; or to improve on the identified resource services.

Restoration: Actions taken to replace as closely as possible the quality and quality of ecosystem functions; or to restore the identified resources services overall.

MAP UNITS:
The delineation of the Landscape Units as natural divisions for control of use; divisions of the Township which reflect its landscape characteristics at the various levels of detail noted by the Natural Resource

(Zimmerman & Kailing, 1990)

Districts, Critical Natural Areas, and Sensitive Natural Sites.

MARSHES:
Wetlands with standing water and emergent aquatic plants.

MONITORING REQUIREMENTS:
Activities which will check to see that the proscribed design and management policies, as put forth in the natural resources plan, are being properly implemented and that the resource requirements are, or are not, being met, allowing for changes to be made accordingly. Some elements that need to be measured are:

Water Hydroperiod: Seasonal regime of waterlevels, as in wetlands.

Water Quality: Including clarity, purity, and temperature; measurements include turbidity, water chemistry (dissolved oxygen, salinity, and pH) and fertility (especially available phosphorus).

Soil: Erosion and stability.

Plant and Animal life: Populations of key native species as well as populations of pests or undesirable plants and animals. Overall indigenous species diversity and regeneration of key species (especially oak).

NATURAL CONDITION:
The state of not being altered by human use.

NATURAL LANDSCAPING:
Maintaining indigenous, or appropriate horticultural, forest or grassland groundcover and natural litter with little or no mowing or other disturbance Serves to provide and enhance animal habitat, soil and water conservation: species diversity, oak regeneration, aesthetics, with low maintenance requirements.

NATURAL RESOURCES:
The attributes of the natural system that society values. Some of these are air, water (surface and ground), lakes, rivers and streams, native topographic and geologic features (valleys, outcrops), minerals, soils, forests, grasslands, wetlands, diverse indigenous plant and animal species, diverse native species associations, recreational open space, scenic vistas and viewsheds, and historic monuments.

NATURAL RESOURCE DISTRICT:
Major natural division in the landscape based on soils, land form, major groundwater recharge areas, surface drainage patterns, native vegetation and wildlife. The emphasis is on major resource elements such as watersheds, agriculture, and recreational open space, with the planning focus on broad conservation land use policies.

(Zimmerman & Kailing, 1990)

PEST SPECIES:
A plant or animal whose tendency to over abundance threatens other species' existence. For example:

Deer and Rabbits: Threaten regeneration and diversity of trees and forest plants.

Alien Plants: Buckthorn, Norway maple, reed canary grass, purple loosestrife all threaten native vegetation.

Uncontrolled-Dogs, Cats, and Other Pets: Threaten bird reproduction.

Native Plant Species In Wrong Biotypes: Prevent normal regeneration (they are out of place through human intervention).

POLLUTANTS:
Materials which are stressful to life-supporting systems.

PRAIRIES:
Indigenous associations of grasses and forbs (of 100-400 species); in Middleton, including dry lime, or "goat", prairies (short species on steep, .hot, thin soiled, rocky bluffs); tallgrass or wet to mesic prairies on deep undisturbed soils, such as on unaltered grades of rights-of-ways.

PREFERRED USES:
Land uses which should, given ecological conditions, resource requirements, and landscape character, be considered optimal.

Conservancy: Leave in natural, undisturbed state; natural or scientific reserves.

Agricultural: Cropland, pasture, or woodlot with sustainability standards.

Residential: Low-density dwellings or localized neighborhood clusters with soil, water, and biotic resource sustainability standards.

Recreational: Low-impact use such as skiing, hiking or biking; natural public parks.

RESOURCE REQUIREMENTS:
What is required to sustain the basic ecosystem functions that provide the resource base. Some of the ecosystem functions already identified in the Town of Middleton include:

Life support: Habitat in sufficient, contiguous areas to maintain desired species populations. Demands protection of water quality and control of pest species.

Soil and water conservation: Control of surface runoff, erosion, soil compaction and pollution.

Gene Bank and Regeneration: Special monitoring of desired, individual native species and adjustments to insure it's the survival of its population and genetic heritage.

Scenic Vistas and Viewsheds: Visual access and the control of blight either by screening or restoration.

(Zimmerman & Kailing, 1990)

RIPARIAN:
Along banks of rivers and streams; river bank forests are sometimes called gallery forests.

SAVANNA:
Open grown trees; In Middleton, usually oaks and prairie beneath; about 8 trees per acre with canopies barely touching, or trees in scattered groves with grassy groundcover maintained by drought, fire, grazing animals, or mowing

SENSITIVE NATURAL SITES:
The most fundamental landscape unit for the protection of biotypes, as well as the preservation of unique landscape features like springs, rock outcrops, sink holes, historic monuments, and special vistas. They are the smallest mapped land use districts to which the special ecological requirements for resource sustainability apply. Good stewardship, however, should be encouraged for each parcel within each Sensitive Site, and design and management recommendations should be applied comprehensively.

SINKS:
Depressions which, because they are connected to permeable or fissured rock and soil, are able to absorb water rapidly. They, therefore, deserve special protection.

STEWARDSHIP:
A management approach that implies the close monitoring and caretaking of natural systems, as an alternative to control of them. Based on a conservation land ethic.

VIEWSHED:
A visual corridor of special aesthetic appeal. Often a natural landscape with a diverse topographic pattern that may include wild as well as cultivated elements (pastoral) and unique features. It usually presents a deep and broad perspective with one or more special aspects. Some examples include agricultural croplands, cow pastures and red barns, forest backdrops, ridges and hilltops, ponds, and meandering streams.

VISTA:
A vantage point from which a desirable view can be had. WATERSHED:
That portion of a landscape from which water drains into a common outlet; refers especially to surface stormwater and snowmelt runoff management. (Groundwater watersheds may extend beyond surface divides and be much larger).

WATERWAY:
Any route which surface waters follow at least once a year, including drainage gullies, intermittent watercourses, flowing stream channels, and floodplains.

WETLANDS:
Landscapes with waterlogged soils and flooded conditions for more than 5 hours at a time during the growing season. Middleton wetlands include wet-prairies, sedge meadows, carrs, floodplain forests, riparian sloughs, deep-water marshes, and ponds.

(Zimmerman & Kailing, 1990)

TABLE A-1 UPLAND OAK FOREST COMPOSITION IN THE TOWN OF MIDDLETON

CANOPY TREES

BOTANICAL NAME	COMMON NAME	COMMENT
Carya ovata	Shagbark Hickory	Dominant
Quercus alba	White Oak	Dominant
Quercus borealis	Red Oak	Dominant
Quercus macrocarpa	Burr Oak	Dominant
Quercus velutina	Black Oak	Dominant
Populus tremuloides	Quaking Aspen	Sub-Dominant
Prunus serotina	Black Cherry	Sub-Dominant
Acer rubrum	Red Maple	Occasional
Carya cordiformis	Bitternut Hickory	Occasional
Celtis occidentalis	Hackberry	Occasional
Ostrya virginiana	Ironwood	Occasional
Tilia americana	Basswood	Occasional
Ulmus americana	American Elm	Occasional
Ulmus rubra	Slippery Elm	Occasional

MIDSTORY TREES

BOTANICAL NAME	COMMON NAME	COMMENT
- - - -	All Canopy Species	Saplings (Oaks are rare)
Acer negundo	Box Elder	Sapling
Amelanchier spp.	Shadbush	Shrub
Aronia melanocarpa	Chokeberry	Shrub
Cornus alternifolia	Pagoda Dogwood	Shrub
Cornus racemosa	Gray Dogwood	Shrub
Cornus rugosa	Big-Leaf Dogwood	Shrub
Corylus americana	Hazelnut	Shrub
Crataegus spp.	Hawthorne	Shrub
Pyrus ioensis	Wild Crab	Shrub
Ribes missouriense	Missouri Gooseberry	Shrub
Rubus idaeus	Red Raspberry	Shrub
Rubus occidentalis	Black Raspberry	Shrub
Sambucus canadensis	Black Eldeberry	Shrub
Viburnum spp.	Viburnums	Shrub
Celastrus scandens	Bittersweet	Vine
Parthenocissua spp.	Woodbine	Vine
Rhus radicans	Poison Ivy	Vine
Vitis spp.	Wild Grape	Vine

(Zimmerman & Kailing, 1990)

UNDERSTORY HERBS

BOTANICAL NAME	COMMON NAME	FLOWERING TIME
Anemone quinqufolia	Wood Anemone	Spring
Aralia nudicaulis	Wild Sarsaparilla	Spring
Carex pennsylvanica	Pennsylvania Sedge	Spring
Geranium maculatum	Wild Cranesbill	Spring
Osmorhiza claytonii	Sweet Cicely	Spring
Polygatum spp.	Solomon's Seal	Spring
Ranunculus abortivus	Small Crowfoot	Spring
Sanicula marilandica	Black Snakeroot	Spring
Smilicina racemosa	Starry Solomon' Seal	Spring
Smilicina stellata	Solomon's Plume	Spring
Viola sororia	Hairy Blue Violet	Spring
Agrimonia spp.	Agrimony	Summer
Amphicarpa bracteata	Hog Peanut	Summer
Aralia racemosa	Spikenard	Summer
Asclepias	Poke Milkweed	Summer
Athyrium felix-femina	Lady Fern	----
Circaea quadrisulcata	Enchanter's Nightshade	Summer
Desmodium spp.	Tick Terfoil	Summer
Festuca obtusa	Woodland Fescue	Summer
Galium spp.	Bedstraw	Summer
Geum canadense	White Avens	Summer
Hackelia americana	Stickseed	Summer
Helianthus strumosus	Woodland Sunflower	Summer
Monotropa unifora	Indian Pipe	Summer
Parietaria pensylvanica	Pellitory	Summer
Phryma leptostachya	Lopseed	Summer
Triosteum perfoliatum	Feverwort	Summer
Aster sagittifolius	Arrow-Leaved Aster	Fall
Eupatorium rugosum	White Snakeroot	Fall
Prenanthes alba	Lion's Foot	Fall
Pterdium auilinum	Bracken Fern	----

(Rarer species may also be present; additional species will be found on sandy, gravelly or rocky soils and in wet areas)

(Zimmerman & Kailing, 1990)

TABLE A-2 TREE AND SHRUB SPECIES IN TOWN OF MIDDLETON

LOW-SHADE TOLERANT SPECIES

BOTANICAL NAME	COMMON NAME	COMMENT
Celastrus scandens	Bittersweet	Vine
Populus deltoides	Cottonwood	Tree (can tolerate some flooding)
Populus tremuloides	Quaking Aspen	Tree
Prunus americana	Wild Plum	Shrub
Pyrus ioensis	Wild Crab	Shrub
Quercus alba	White Oak	Tree
Quercus macrocarpa	Burr Oak	Tree (can tolerate some flooding)
Quercus velutina	Black Oak	Tree
Robinia psuedo-acacia	Black Locust	Tree (alien in Town of Middleton)

MEDIUM-SHADE TOLERANT SPECIES

BOTANICAL NAME	COMMON NAME	COMMENT
Acer negundo	Box Elder	Tree (can tolerate some flooding)
Acer saccharinum	Silver Maple	Tree (can tolerate some flooding)
Alnus spp.	Alder	Shrub (can tolerate some flooding)
Amelanchier spp.	Shadbush	Shrub
Aronia melanocarpa	Chokeberry	Shrub
Berberis thunbergii	Japanese Barberry	Shrub (alien to Town of Middleton)
Carya ovata	Shagbark Hickory	Tree
Carya cordiformis	Bitternut Hickory	Tree
Cornus alternifolia	Pagoda Dogwood	Shrub
Cornus amomum	Silky Dogwood	Shrub
Cornus racemosa	Gray Dogwood	Shrub
Cornus rugosa	Big-Leaf Dogwood	Shrub
Cornus stolonifera	Red-Osier Dogwood	Shrub (can tolerate some flooding)
Corylus americana	Hazelnut	Shrub
Crataegus spp.	Hawthorne	Shrub
Fraxinus americana	White Ash	Tree
Ilex verticillata	Winterberry	Shrub (can tolerate some flooding)
Juglans cinerea	Butternut	Tree
Juglans nigra	Black Walnut	Tree (alien to Town of Middleton)
Lonicera morrowi x bella	Bella Honeysuckle	Shrub (alien to Town of Middleton)
Ostrya virginiana	Ironwood	Tree

(Zimmerman & Kailing, 1990)

BOTANICAL NAME	COMMON NAME	COMMENT
Prunus virginiana	Choke Cherry	Shrub
Quercus borealis	Red Oak	Tree
Rhamnus frangula	Fen Buckthorn	Shrub (alien, tolerates flooding)
Rhus radicans	Poison Ivy	Vine
Ribes missouriense	Missouri Gooseberry	Shrub
Rubus allegheniensis	Blackberry	Shrub
Rubus idaeus	Red Raspberry	Shrub
Rubus occidentalis	Black Raspberry	Shrub
Sambucus canadensis	Black Elderberry	Shrub (tolerates some flooding)
Tilia americana	Basswood	Tree
Viburnum acerifolium	Arrowwood Viburnum	Shrub
Viburnum lentago	Nannyberry	Shrub
Viburnum trilobum	Highbush Cranberry	Shrub
Vitis riparia	River Grape	Vine

HIGH-SHADE TOLERANT SPECIES

BOTANICAL NAME	COMMON NAME	COMMENT
Acer rubrum	Red Maple	Tree (can tolerate some flooding)
Acer platanoides	Norway Maple	Tree (alien to Town of Middleton)
Acer saccharum	Sugar Maple	Tree (alien to Town of Middleton)
Acer saccharinum	Silver Maple	Tree
Celtis occidentalis	Hackberry	Tree (can tolerate some flooding)
Hamamelis virginiana	Witch Hazel	Shrub
Fraxinus pennsylvanica	Green Ash	Tree (can tolerate some flooding)
Rhamnus cathartica	Cathartic Buckhorn	Tree (alien to Town of Middleton)
Ulmus americana	American Elm	Tree (can tolerate some flooding)
Ulmus rubra	Slippery Elm	Tree

(Zimmerman & Kailing, 1990)

TABLE A-3 WILDLIFE OF THE UPLAND DECIDUOUS FOREST AND FOREST EDGES
IN THE TOWN OF MIDDLETON
BREEDING BIRDS

SUMMER RESIDENTS	PERMANENT RESIDENTS
Mourning Dove	Ruffed Grouse
Flycatchers (5)	Wild Turkey
Robin	Woodpeckers (5)
Wood Thrush	Crow
Towhee	Bluejay
Northern Oriole	White-Breasted Nuthatch
Scarlet Tanager	Black-Capped Chickadee
Rose-Breasted Grosbeak	Tufted Titmouse
Brown Thrasher	Cardinal
Catbird	Goldfinch
Indigo Bunting	Owls (3)
Vireos (3)	Hawks (2)
Warblers (4)	Starling
Oven-Bird	
Ruby Throated Hummingbird	
Wild Sparrows (3)	
House Wren	
Hawks (2)	
Vulture	
Cuckoos (2)	
Whippoorwill	
Cedar Waxwing	
Wood Duck	

MIGRANTS only in Spring and Fall: About 100 species.

Forest block fragmentation is exposing song bird6 to increased predation of eggs & young by raccoons, crows, and cowbirds which have overpopulated due to waste grain availability.

MAMMALS

Bats (3)	Striped Skunk	Mink
Shrews (2)	Raccoon	Beaver
Mice (2)	Woodchuck	White-Tailed Deer
Squirrels (2)	Foxes	Coyote
Opossum	Weasels	Cottontail Rabbit

(Zimmerman & Kailing, 1990)

REPTILES	AMPHIBIANS
Snake (5)	Spring Peeper
	American Toad
	Tree Frogs (2)
	Salamander (2)

Most vertebrate species are not particular about the vegetation species they inhabit although plant structure, continuity of plant corridors, overall acreage, amount of groundcover and edge are important to wildlife for food, shelter, and reproduction. While most mammals have wide ranges, birds have breeding densities of about one-half pair per acre for interior forest species and up to five pairs per acre for forest edge species. In addition, 100 species of migratory non-breeders will also find adequate habitat in spring and fall when the breeding species do not need all the space and food.

TABLE A-4 CHARACTERISTIC SAVANNA AND OAK OPENING PLANT SPECIES FOUND IN DANE COUNTY, WISCONSIN

BOTANICAL NAME	COMMON NAME	COMMENT
Andropogon gerardi	Big Bluestem	Grass
Anemone patens	Pasque Flower	Forb
Antennaria neglecta	Pussytoes	Forb
Apocynum androsaemifolium	Spreading Dogbane	Forb
Arenaria lateriflora	Side-Flower Sandwort	Forb
Asclepias purpurescens	Red Milkweed	Forb (rare)
Carex pensylvanica	Pennsylvania Sedge	Sedge
Ceanothus americana	New Jersey Tea	Shrub
Danthonia spicata	Poverty Grass	Grass
Dodecatheon meadia	Shooting Star	Forb
Erigeron pulchellus	Fleabane	Forb
Gerardia gradiflora	Yellow Foxglove	Forb
Helianthus strumosus	Rough Sunflower	Forb
HieraciuM scabrum	Rough Hawkweed	Forb
Lysimachia quadrifolia	Whorled Loosestrife	Forb
Poe pratensis	Kentucky Bluegrass	Grass
Ranunculus fascicularis	Early Buttercup	Forb
Sorghastrum nutans	Indiangrass	Grass
Solidago ulmifolia	Elm-Leaved Goldenrod	Forb
Schizachyrium scoparius	Little Bluestem	Grass
Taenidia integerrima	Yellow Pimpernel	Forb

(Zimmerman & Kailing, 1990)

TABLE B-1 PLANT SPECIES OF TOWN OF MIDDLETON "GOAT" PRAIRIES

BOTANICAL NAME	COMMON NAME	COMMENT
Amorpha canescens	Leadplant	Forb
Andropogan gerardi	Big Bluestem	Grass
Anemone patens	Pasque Flower	Forb
Antennaria patens	Pussytoes	Forb
Asclepias viridiflora	Green Milkweed	Forb (rare)
Asclepias verticillata	White Whorled Milkweed	Forb
Asparagus officinalis	Asparagus	Forb (alien)
Aster azureus	Azure Aster	Forb
Aster laevis	Smooth Aster	Forb
Aster oblongifolius	Oblong-leaved Aster	Forb
Aster pilosus	Frost Aster	Forb
Aster sericeus	Silky Aster	Forb
Bouteloua curtipendula	Side-Oats Grama	Grass
Carex abdita	Hidden Sedge	Sedge
Castilleja sessiliflora	White Indian Paintbrush	Forb (rare)
Comandra richardsonia	Star Toadflax	Forb
Coreopsis palmata	Stiff Coreopsis	Forb
Erigeron stigosus	Daisy Fleabane	Forb
Eupatorium altissimum	Tall Boneset	Forb (rare)
Euphorbia corollata	Flowering Spurge	Forb
Euphorbia esula	Leafy Spurge	Forb (alien)
Juglans nigra	Black Walnut	Woody Invader
Kuhnia eupatoroides	False Boneset	Forb
Lithospermum incisum	Yellow Puccoon	Forb
Linum sulcatum	Yellow Flax	Forb
Lonicera x "bella"	Bella Honeysuckle	Shrub (alien)
Monarda fistulosa	Wild Bergamot	Forb
Oenothera biennis	Evening Primrose	Forb
Panicum linearifolium	Early Panic Grass	Grass
Petalostemum purpureum	Purple Prairie Clover	Forb
Poa pratensis	Kentucky Bluegrass	Grass (alien)
Populus tremuloides	Quaking Aspen	Tree (invader)
Potentilla arguta	Tall Cinquefoil	Forb
Prunus serotina	Black Cherry	Tree (invader)
Quercus macrocarpa	Burr Oak	Tree
Quercus veluntina	Black Oak	Tree
Ratibida pinnata	Yellow Coneflower	Forb
Rhamnus cathartica	Cathartic Buckhorn	Shrub (alien)
Rhus glabra	Smooth Sumac	Shrub (invader)
Rhus radicans	Poison Ivy	Vine/Herb

(Zimmerman & Kailing, 1990)

BOTANICAL NAME	COMMON NAME	COMMENT
Rosa blanda	Wild Rose	Shrub
Schizachyrium scoparius	Little Bluestem	Grass
Scutellaria parvula	Small Skullcap	Forb
Solidago altissima	Common Goldenrod	Forb
Solidago nemoralis	Old Field Goldenrod	Forb
Sorghastrum nutans	Indiangrass	Grass
Sporobolus heterolipis	Prairie Dropseed	Grass
Viola pedatifida	Prairie Violet	Forb
Viola pedata	Birdsfoot Violet	Forb

TABLE B-2 PRAIRIE PLANT SPECIES OF RAILROAD CORRIDORS IN SOUTHERN WISCONSIN

BOTANICAL NAME	COMMON NAME	COMMENT
Achillea millefolium	Yarrow	Forb
Agropyron repens	Quackgrass	Grass (Non-native Invader)
Agropyron trachycaulum	Wheatgrass	Grass
Agrostis alba/gigsantea	Redtop	Grass (Non-Native Invader)
Allium cernuum	Nodding Wild Onion	Forb
Allium canadense	Wild Garlic	Forb
Ambrosia psilostachya	Western Ragweed	Forb
Amorpha canescens	Leadplant	Shrub
Andropogon gerardi	Big Bluestem	Grass
Anemone canadensis	Canada Anemone	Forb (wet sites)
Anemone cylindrica	Thimbleweed	Forb
Antennaria neglecta	Pussytoes	Forb
Apocynum androsaemifolium	Dogbane	Forb
Apocynum sibiricum	Indian Hemp	Forb (wet sites)
Artemisia caudata	Wormwood	Forb (dry sites)
Artemisia ludoviciana	White Sage	Forb
Artemisia serrata	River Sage	Forb (wet sites)
Asclepias hirtella	Green Milkweed	Forb (rare)
Asclepias purpurascens	Purple Milkweed	Forb (rare)
Asclepias syriaca	Common Milkweed	Forb
Asclepias tuberose	Butterfly weed	Forb
Asclepias verticillata	White Whorled Milkweed	Forb (dry sites)
Aster azureus	Azure Aster	Forb (dry sites)
Aster ericoides	Heath Aster	Forb
Aster laevis	Smooth Aster	Forb
Aster lucidulus	Marsh Aster	Forb (wet sites)
Aster novae-angliae	New England Aster	Forb (wet sites)

(Zimmerman & Kailing, 1990)

BOTANICAL NAME	COMMON NAME	COMMENT
Aster oblongifolius	Oblong Aster	Forb
Aster pilosus	Frost Aster	Forb
Aster sericeus	Silky Aster	Forb
Aster simplex	White Marsh Aster	Forb (wet sites)
Astragalus canadensis	Milk Vetch	Forb
Baptisia leucantha	White Wild Indigo	Forb
Baptisia leucophaea	Cream Indigo	Forb
Bouteloua curtipendula	Side-Oats Grama	Grass
Bromus mollis/inermis	Smooth Brome	Grass (alien)
Cacalia atriplicifolia	Tall Indian Plantain	Forb
Cacalia suaveolens	Yellow Indian Plantain	Forb (wet sites)
Cacalia tuberosa	Indian Plantain	Forb (wet sites; rare)
Calamagrostis canadensis	Bluejoint Grass	Grass (wet sites)
Camassia scilloides	Wild Hyacinth	Forb (rare)
Carex abdita	Sedge	Sedge
Carex Bicknellii	Sedge	Sedge
Carex brevior	Sedge	Sedge (dry sites0
Carex Buxbaumii	Sedge	Sedge (wet sites)
Carex conoidea	Sedge	Sedge (wet sites)
Carex foenea	Sedge	Sedge
Carex gravida	Sedge	Sedge
Carex Haydenii	Sedge	Sedge (wet sites)
Carex lanuginosa	Sedge	Sedge
Carex Meadii	Sedge	Sedge
Carex muhlenbergii	Sedge	Sedge (dry sites)
Carex tetanica	Sedge	Sedge (wet sites)
Carex trichocarpa	Sedge	Sedge (wet sites)
Castilleja coccinea	Indian Paintbrush	Forb (wet sites)
Ceanothus americanus	New Jersey Tea	Shrub
Centaurea maculosa	Spotted Knapweed	Forb (Non-Native Invader)
Cicuta maculata	Spotted Water Hemlock	Forb (wet sites)
Cirsium arvense	Canada Thistle	Forb (Non-Native Invader)
Cirsium discolor	Prairie Thistle	Forb
Cirsium Hillii	Hill's Thistle	Forb (dry sites; rare)
Cirsium muticum	Fen Thistle	Forb (wet sites)
Cirsium vulgare	Bull Thistle	Forb (Non-Native Invader)
Comandra richardsonii	Star Toadflax	Forb
Convolvulus sepium	Wild Morning Glory	Forb (wet sites)
Convolvulus spithamaeus	Erect Morning Glory	Forb
Coreopsis palmate	Stiff Coreopsis	Forb
Cypripedium Calceolus	Yellow Lady Slipper	Forb
Cypripedium candidum	White Lady Slipper	Forb (wet sites; rare)

(Zimmerman & Kailing, 1990)

BOTANICAL NAME	COMMON NAME	COMMENT
Dactylis glomerate	Orchard Grass	Grass (Non-Native Invader)
Daucus carota	Wild Carrot	Forb (Non-Native Invader)
Desmodium canadense	Canadian Tick Trefoil	Forb
Desmodium illinoense	Illinois Tick Trefoil	Forb
Dodecatheon mendia	Shooting Star	Forb (abundant)
Echinacea pallida	Pale Purple Coneflower	Forb (rare)
Echinacea purpurea	Early Purple Coneflower	Forb (from farther South)
Elymus canadensis	Canada Wild Rye	Grass
Eleocharis compressa	Spike Rush	Sedge (wet sites)
Eleocharis elliptica	Spike Rush	Sedge (wet sites)
Equisetum arvense	Common Horsetail	Forb
Equisetum kensanum	Scouring Rush	Farb
EragrOttis spectabilis	Purple Lovegress	Grass
Erigeron strigosus	Daisy Fleabane	Forb
Eryngium yuccifolium	Rattlesnake Master	Forb (rare)
Eupatorium altissimum	Tall Boneset	Forb (rare)
Euphorbia corollata	Flowering Spurge	Forb
Euphorbia Esula	Leafy Spurge	Farb (alien/aggressive)
Festuca elatior	Tall Fescue	Grass (alien)
Festuca rubra	Creeping Fescue	Grass (alien)
Fragaria virginiana	Wild Strawberry	Forb
Galium boreale	Northern Bedstraw	Forb
Galium obtusum	Low Bedttraw	Forb
Gaura biennis	Gaura	Forb (rare)
Gentiana Andrewsii	Bottle Gentian	Forb (wet sites)
Gentiana crinita	Fringed Gentian	Forb (rare)
Gentiana flavida	Yellow Gentian	Forb (rare)
Gentiana puberula	Sand Gentian	Forb (dry sites)
Gerardia aspera	Prairie Getaidia	Forb (dry sites)
Geum aleppicum	Yellow Avent	Forb (wet sites)
Geum triflorum	Prairie Smoke	Forb
Gnaphalium obtusifolium	Cudweed	Forb (diy sites)
Grindelia squarrosa	Tarweed	Forb (dry sites)
Habenaria flava	Green Rein Orchid	Forb (wet sites; rare)
Habenaria leucophaea	White Fringed Orchid	Forb (wet sites; rare)
Helianthemum canadense	Frostweed	Farb (dry sites)
Helianthus grosseserratus	Bigtooth Sunflower	Forb (wet sites)
Helianthus rigidus	Rigid Sunflower	Farb
Helianthus occidentalis	Naked Sunflower	Forb
Helianthus strumosus	Rough Sunflower	Forb
Heliopsis helianthodes	Early Sunflower	Forb
Heuchra richardsonii	Alum Root	Forb

(Zimmerman & Kailing, 1990)

BOTANICAL NAME	COMMON NAME	COMMENT
Hieracium longipilum	Hairy Hawkweed	Forb (dry sites)
Hierochloe odorata	Sweet Grass	Grass (wet sites)
Hypericum perforatum	St. John's Wort	Forb (alien/aggresive)
Hypoxis hirsuta	Yellow Stars	Forb
Juncus Dudleyi	Rush	Rush (wet sites)
Juncus Greenei	Rush	Rush (dry sites)
Koeleria cristata	Junegrass	Grass
Krigia biflora	Prairie Dandelion	Forb
Kuhnia eupatorioides	False Boneset	Forb (dry sites)
LaCtuca canadensis	Wild Lettuce	Forb
Lactuca ludoviciana	Blue Lettuce	Forb
Lathyrus palustris	Marsh Pea	Vine (wet sites)
Lathyrus venosus	Veiny Pea	Forb
Leptoloma cognatum	Fall Witch Grass	Grass (dry sites)
Lespedeza capitata	Prairie Bush Clover	Forb
Liatris aspera	Rough Blazing Star	Forb (wet sites)
Liatris pycinostachya	Prairie Blaiihg Star	Forb (wet sites)
Lilium philadelphicum	Wood Lily	Forb
Lilium michiganense	Turk's Cap Lily	Forb (wet sites)
Linaria vulgaris	Butter and Eggs	Forb (Non-Native invader)
Lithospermum canescens	Orange Puccoon	Forb
Lithospermum croceum	Sand Puccoon	Forb (dry sites)
Lobelia spicata	Pale Lobelia	Forb
Lupinus perennis	Lupine	Forb (dry sites)
Lycopus americanus	Water Horehound	Forb wet sites)
Lysimachia lanceolata	Lance-leaved Loosestrife	Forb
Lythrum alatum	Wild Pink Loosestrife	Forb (wet sites)
Medicago lupulina	Black Medic Clover	Forb (Non-Native Invader)
Medicago sativa	Alfalfa	Forb (alien, planted)
Melilotus spp.	Sweet Clovers	Forb (non-Native Invader)
Mentha arvensis	Wild Mint .	Forb (wet sites)
Mirabilis nyctaginea	Four O'Clock	Forb (dry sites)
Monarda fistulosa	Wild Bergamot	Forb
Muhlenbergia cuspidata	Muhly Grass	Grass (rare)
Muhlenbergia racemosa	Muhly Grass	Grass (wet sites)
Napaea dioica	Glade Mallow	Forb (wet sites)
Oenothera biennis	Evening Primrose	Forb
Oenothera perennis	Sundrops	Forb
Onosmodium occidentalis	False Gromwell	Forb (dry sites)
Oxalis stricta	Yellow Wood Sorrel	Forb
Oxalis violacea	Pink Wood Sorrel	Forb
Oxypolis rigidior	Cowbane	Forb (wet sites)

(Zimmerman & Kailing, 1990)

BOTANICAL NAME	COMMON NAME	COMMENT
Panicum linearifolium	Panicgrass	Grass
Panicum leibergii	Panicgrass	Grass
Panicum olgosahthes scribner	Panicgrass	Grass
Panicum praecocius	Panicgrass	Grass
Panicum virgatum	Switchgrass	Grass
Parthenium integrifolium	Wild Quinine	Forb (rare)
Pastinaca sativa	Wild Parsnip	Forb (alien)
Pedicularis canadensis	Wood Betony	Forb
Penstemon digitalia	White Penatemon	Forb
Penstemon hirsutus	Hairy Beardstongue	Forb
Penstemon tubaeflorus	Sticky Beardstongue	Forb (rare)
Petalostemum Candidum	White Prairie Clover	Forb
Petalostemum parpureum	Purple Prairie Clover	Forb
Phalaris arundinacea	Reed Canary Grasp	Grass (alien/aggressive)
Phleum pratense	Timothy	Grass (alien)
Phlox pilosa	Pink Phlox	Forb
Physalis heterophylla	Sticky Ground Cherry	Forb
Physalis virginiana	Virginia Ground Cherry	Forb
Physalis subglabrata	Smooth Ground Cherry	Forb
Plantago spp.	Plantains	Forb (some = alien invaders)
Poa compressa	Canada Bluegrass	Grass (alien, dry sites)
Poa pratensis	Kentucky Bluegrass	Grass (alien)
Polemonium reptans	Jacob's Ladder	Forb
Polygala sanguinea	Field Milkwort	Forb
Polygala senega	Seneca Snakeroot	Forb (rare)
Polygala verticillata	Whorled Milkwort	Forb
Polygonum coccineum	Perennial Smartweed	Forb (wet sites)
Polytaenia nuttallii	Prairie Parsley	Forb (rare)
Potentilla arguta	Tall Cinquefoil	Forb (dry sites)
Potentilla recta	Sulpher Cinquefoil	Forb (alien invader)
Potentilla simplex	Yellow Cinquefoil	Forb
Prenanthes aspera	Rough Lettuce	Forb (rare)
Prenanthes racemosa	Rattlesnake Root	Forb (wet sites)
Prunella vulgaris	Heal-all	Forb
Psoralea esculenta	Prairie Turnip	Forb (dry sites; rare)
Pycnanthemum virginicum	Mountain Mint	Forb
Ranunculus fascicularis	Early Buttercup	Forb
Ranunculus rhomboideus	Dwarf Buttercup	Forb
Ratibida pinnata	Yellow Coneflower	Forb
Rosa blanda	Wild Rose	Shrub
Rudbeckia hirta	Brown-Eyed Susan	Forb
Rudbeckia subtomentosa	Sweet Black-Eyed Susan	Forb

(Zimmerman & Kailing, 1990)

BOTANICAL NAME	COMMON NAME	COMMENT
Salix humilis	Prairie Willow	Shrub
Saponaria officinalis	Bouncing Bet	Forb (Non-Native Invader)
Schizachryium scoparius	Little Bluestem	Grass .
Sceleria triglomerata	Stone Sedge	Sedge (wet sites; rare)
Scutellaria Leonardi	Smooth Small Skullcap	Forb (dry sites)
Senecio pauperculus	Ragwort	Forb
Senecio plattensis	Hoary Ragwort	Forb
Silphium integrifolium	Rosinweed	Forb
Silphium laciniatum	Compass Plant	Forb
Silphium perfoliatum	Cupplant	Forb (wet sites)
Silphium terebinthinaceum	Prairie Dock	Forb (wet sites)
Sisyrinchium campestre	Blue-Eyed Grass	Forb
Smilacina stellate.	Starry Solomon Seal	Forb
Solidago altissima	Common Goldenrod	Forb
Solidago gigantea Marsh	Goldenrod	Forb (wet sites)
Solidago graminifolia	Grass leaf Goldenrod	Forb
Solidago missouriensis	Early Goldenrod	Forb
Solidago nemoralis	Old Field Goldenrod	Forb
Solidago rigida	Stiff Goldenrod	Forb
Solidago speciosa	Showy Goldenrod	Forb
Sorghastrum nutans	Indiangrass	Grass
Spiranthes cernua	Ladies Tresses Orchid	Forb
Spirea alba White	Spirea	Shrub
Spartina pectinata	Cordgrass	Grass (wet sites)
Sporobolus asper	Dropseed	Grass
Sporobolus heterolepis	Prairie Dropseed	Grass
Sporobolus vaginiflorus	Dropseed	Grass
Stachys palustris	Woundwort	Forb (wet sites)
Stipa spartea	Needlegrass	Grass.
Taraxacum officinale	Dandelion	Forb (alien invader)
Teucrium canadense	Germander, Wood Sage	Forb
Thalictrum dasycarpum	Tall Meadowrue	Forb (wet sites)
Tradescantia ohiensis	Ohio Spiderwort	Forb.
Trifolium spp.	Clovers	Forbs (alien, planted)
Valeriana ciliata	Valerian	Forb (rare)
Verbena hastata	Vervain	Forb (wet sites)
Verbena stricta	Hoary Vervain	Forb
Vernonia fasciculata	Western Ironweed	Forb (wet sites)
Veronicastrum virginicum	Culver's Root	Forb
Vicia americana	Wild Vetch	Forb
Viola cucullata	Marsh Violet	Forb (wet sites)
Viola pedata	Birdsfoot Violet	Forb

(Zimmerman & Kailing, 1990)

BOTANICAL NAME	COMMON NAME	COMMENT
Viola pedatifida	Prairie Violet	Forb
Zygadenus elegans	White Camas	Forb (rare)
Zizia aptera	Heart-Leaved Alexander	Forb
Zizia aurea Golden	Alexander	Forb

(Zimmerman & Kailing, 1990)

TABLE B-3 PRAIRIE WILDLIFE APPROPRIATE FOR GRASSLAND PRESERVES IN THE TOWN OF MIDDLETON

BIRDS OF GRASSLAND HABITATS LOCATED DURING INVENTORY

Horned Lark
Western Meadowlark
Sedge Wren
Yellowthroat
Grasshopper Sparrow
Field Sparrow
Vesper Sparrow
Ring-Neck Pheasant
Bluebird
Tree Swallow
Mourning Dove
Eastern Meadowlark
Bobolink
Dickcissel
Savannah Sparrow
Song Sparrow
Henslow's Sparrow
Swamp Sparrow
Kestrel
Shrike
Nighthawk
Redwing Blackbird

ADDITIONAL BIRDS EXPECTED AFTER SITE RESTORATION

Upland Sandpiper
Short-Eared Owl
Quail (In Fencerows)
Harriers
Ducks (In Nearby Wetlands)
Gray Partridge (Non-Native)
Geese (In Nearby Wetlands)
Cranes (In Nearby Wetlands)

MAMMALS OF GRASSLAND HABITATS

MAMMALS LOCATED DURING INVENTORY

Mole
Ground Squirrel
Meadow Mice (Voles)
Fox

ADDITIONAL MAMMALS EXPECTED AFTER SITE RESTORATION

Badger

POPULATION ESTIMATES FOR GRASSLAND WILDLIFE

A. Species Requiring Large Territories of One Square Mile or Greater Include: Badger; Harrier and Owl (1 pair each)

B. Songbirds at Average of 0.5 Nest/Acre in 900 Acres of Grassland Would Come To Be 450 Mating Pairs With an Average of 22 Broods per Species Per Year.

C. Game Birds Have an Average of One Brood/45 Acres or Approximately 20 Broods Per 900 Acres Per Year.

(Zimmerman & Kailing, 1990)

TABLE C-1 SHALLOW MARSH PLANT SPECIES IN DANE COUNTY, WISCONSIN MACROPHYTES

BOTANTICAL NAME	COMMON NAME	COMMENTS
Acorus calamus	Sweetflag	EAM; S
Alisma plantago-aquatica	Water Plantain	S
Anacharis canadensis	Elodea Waterweed	SAM
Asclepias incarnata	Marsh Milkweed	F
Azolla caroliniana	Water Velvet	D
Bidens cernuua	Nodding Bur-Marigold	S; **
Ceratophyllum demersum	Coontail	SAM; **
Carex aquatilis	Water Sedge	EAM
Carex atherodes	Wheat Sedge	EAR
Carex comosa	Bottlebrush Sedge	F
Carex rostrata	Beak Sedge	EAM; M
Carex trichocarpa	Hairyfruit Sedge	EAM
Cicuta bulbifera	Slender Hemlock	F
Cyperus erythrorhizos	Redroot Sedge	S
Cyperus esculentus	Nutsedge	S; * *
Echinochoa Walteri	Barnyard Millet	S; * *
Eleocharis acicularis	Tiny Spikerush	S
Eleocharis erythropoda	Redfoot Spikerush	EAM
Eleocharis elliptica	Turf Spikerush	S; F
Eleocharis Smallii	Big Spikerush	EAM
Equisetum fluviatile	Marsh Scouringrush	EAM
Galium tinctorium	Small Bedstraw	F
Glyceria grandis	Big Manna Grass	EAM
Glyceria borealis	Floating Manna Grass	EAM
Leersia oryzoides	Rice Cutgrass	S
Lemna minor	Common Duckweed	D; **
Lemna trisulca	Underwater Duckweed	SAM
Ludwigia palustris	Boxseed	S
Myriophyllum spp.	Mil foils	SAM, one Alien
Najas flexilis	Najad	SAM; **
Nuphar luteum	Yellow Cow Lily	EAM
Nymphaea cordata	White Waterlily	EAM
Phalaris arundinacea	Reed Canary Grass	S; A
Phragmites communis	Giant Reed Grass	EAM; S
Pilea pumila	Clearweed	S
Polygonum coccineum	Perennial Smartweed	S
Polygonum lapathifolium	Dockleaf Smartweed	S; F; * *
Pontederia cordata	Pickerelweed	EAM; SAM; M

(Zimmerman & Kailing, 1990)

BOTANTICAL NAME	COMMON NAME	COMMENTS
Potamogeton gramineus	Common Pondweed	SAM; S; **
Potamogeton pectinatus	Sago Pondweed	SAM; **
Ranunculus longirostris	White Water Crowfoot	SAM
Ranunculus sceleratus	Smooth Buttercup	S
Riccia fluitans	Small Water Liverwort	D
Ricciocarpus natans	Large Water Liverwort	D
Rumex orbiculatus	Marsh Dock	F
Rumex maritimus	Shore Dock	S
Sagittaria rigida	Duck Potato	EAM; SAM; M; * *
Sagittaria latifolia	Arrowhead	EAM; **
Scirpus acutus	Hard Roundstem Bulrush	EAM; N; **
Scirpus debilis	Annual Bulrush	F
Scirpus fluviatilis	River Bulrush	EAM; S; N
Scirpus validus	Soft Roundstem Bulrush	EAM; N; **
Scutellaria laterifolia	Sideflower Skullcap	F
Sium suave	Water Parsnip	EAM
Sparganium eurycarpum	Large Bur Reed	EAM
Spartina pectinata	Cord Grass	S
Spirodela pectinata	Big Duckweed	D
Typha angustifolia	Narrow-Leaved Cattail	EAM; N
Typha latifolia	Wide-Leaved Cattail	EAM; N; M
Utricularia vulgaris	Common Bladderwort	SAM
Wolffia spp.	Tiny Duckweed	D
Zizania aquatica	Wild Rice	EAM; X; **

LEGEND

EAM = Emergent Aquatic Macrophyte
D = Floating Duckweed
F = On Floating Mud
M = Muskrat Food
** = Duck Food
SAM = Submergent Aquatic Macrophyte
S = Shoreline and Drawdown Invader
A = Alien Species
N = Supports Bird Nests

(Zimmerman & Kailing, 1990)

TABLE C-2 SEDGE MEADOW PLANT SPECIES IN SOUTHERN WISCONSIN

BOTANTICAL NAME	COMMON NAME	COMMENTS
Agrostis gigantea	Red Top Grass	Grass (alien)
Ambrosia trifida	Tall Ragweed	Forb
Angelica atropurpurea	Angelica	Forb
Asclepias incarnata	Marsh Milkweed	Forb
Aster lucidulus	Marsh Aster	Forb
Aster simplex	Panicled Aster	Forb
Aster novae-angliae	New England Aster	Forb
Aster umbellatus	Flat-Topped White Aster	Forb
Bidens coronata	Bur Marigold	Forb
Bidens cernova	Bur Marigold	Forb
Calamagrostis canadensis	Bluejoint Grass	Grass
Caltha palustris	Marsh Marigold	Forb
Campanula aparinoides	Marsh Bellflower	Forb
Cardamine bulbosa	Marsh Cardamine	Forb
Carex aquatilis	Water Sedge	Sedge
Carex Bebbii	Sedge	Sedge
Carex Buxbaumii	Sedge	Sedge
Carex lacustris	Lake Sedge	Sedge
Carex lasiocarpa	Wiregrass Sedge	Sedge
Carex rostrata	Beaked Sedge	Sedge
Carex sartwellii	Sedge	Sedge
Carex scoparia	Sedge	Sedge
Carex stipata	Sedge	Sedge
Carex stricta	Hummock Sedge	Sedge
Carex tetanica	Sedge	Sedge
Carex trichocarpa	Hairyfruit Sedge	Sedge
Carex vulpinoidea	Sedge	Sedge
Carex vesicaria	Sedge	Sedge
Chelone glabra	Turtlehead	Forb
Cicuta maculata	Water Hemlock	Forb
Cyperus strigosus	Glingale Sedge	Sedge
Dryopteris thelypteris	Marsh Fern	Forb
Eleocharis elliptica	Spikerush	Sedge
Eleocharis erythropoda	Spikerush	Sedge
Epilobium coloratum	Purple-Leaved Willow-Herb	Herb
Epilobium stenophyllum	Narrow-Leaved Willow-Herb	Forb
Equisetum arvense	Common Horsetail	Forb
Erechtites hieracifolia	Marsh Fireweed or Burnweed	Forb
Eupatorium maculatum	Joe-Pye Weed	Forb
Eupatorium perfoliatum	Boneset	Forb

(Zimmerman & Kailing, 1990)

BOTANTICAL NAME	COMMON NAME	COMMENTS
Galium tinctorium	Small Bedstraw	Forb
Glyceria striate	Small Manna Grass	Grass
Impatiens biflora	Jewelweed	Forb
Iris virginica	Blue Flag Iris	Forb
Lathyrus palustris	Marsh Pea	Forb
Lycopus uniflorus	Water Horehound	Forb
Lysimachia thyrsiflora	Tufted Yellow Loosestrife	Forb
Lythrum salicaria	Purple Loosestrife	Forb (alien/weedy)
Menthe arvensis	Wild Mint	Forb
Muhlenbergia racemosa	Anthill Grass	Grass
Phalaris arundinacea	Reed Canary Grass	Grass (alien)
Phragmites communis	Giant Reed Grass	Grass
Pilea pumila	Clearweed	Forb
Poa palustris	Marsh Bluegrass	Grass
Polygomum species	Smartweeds	Forb
Potentilla palustris	Bog Cinquefiol	Forb
Rumex brittanicus	Marsh Dock	Forb
Scirpus atrovirens	Black-Green Bulrush	Sedge
Scirpus cyperinus	Woolgrass Bulrush	Sedge
Scirpus validus & acutus	Roundstem Bulrushes	Sedge
Scutellaria galericulata	Marsh Skullcap	Forb
Solidago gigantea	Marsh Goldenrod	Forb
Stachys palustris	Hedge Nettle Mint	Forb
Stellaria longifolia	Marsh Chickweed	Forb
Thalictrum dasycarpum	Marsh Fern	Forb
Typha latifolia	Irideleaf Cattail	Forb (invader)
Utrica dioica	Marsh Nettle	Forb
Viola cucullata	Marsh Violet	Forb

(Zimmerman & Kailing, 1990)

TABLE C-3 CARR SHRUB PLANT SPECIES IN SOUTHERN WISCONSIN

BONTANCIAL NAME	COMMON NAME	COMMENT
Alnus incana	Tag Alder, Speckled Alder	Shrub
Aster puniceus	Redstem Aster	Forb
Betula pumila glandolitera	Bog Birch	Woody Vine
Clematis virginiana	Virgin's Bower	Vine
Cornus amomum	Silky DogWood	Shrub
Cornus stolonifera	Red-Osier Dogwood	Shrub
Cuscuta gronovii	Marsh Dodder	Vine
Cypripedium parviflorum	Small Yellow Ladyslipper	Herb
Dryopteris cristata	Crested Wood Fern	Herb
Echinocystis lobata	Wild Cucumber	Vine
Galium asprellum	Spiny Bedstraw	Vine
Ilex verticillata	Winterberry Holly	Shrub
Impatiens biflora	Jewelweed	Herb
Onoclea sensibilis	Sensitive Fern	Herb
Polygonum sagittatum	Climbing Tearthumb	Vine
Polygonum scandens	Wild Buckwheat	Vine
Rhamnus cathartica	Cathartic Buckthorn	Shrub (alien/weedy)
Rhamnus frangula	European Fen Buckthorn	Shrub (alien)
Ribes americanum	Black Currant	Shrub
Sambucus canadensis	Black Elderberry	Shrub
Salix bebbiana	Bebb Willow	Shrub
Salix discolor	Pussy Willow	Shrub
Salix interior	Sandbar Willow	Shrub
Salix petiolaris	Slender Willow	Shrub
Saxifraga pensylvanica	Swamp Saxifrage	Herb
Solanum dulcamara	Bittersweet Nightshade	Vine (alien)
Symplocarpus foetidus	Skunk Cabbage	Herb
Viburnum opulus	Guelder Rose	Shrub (alien)

(Zimmerman & Kailing, 1990)

C-4 COMMON DEEP-WATER MARSH ANIMALS IN SOUTHERN WISCONSIN

WATERBIRDS

Pied-billed Grebe (B)
Blue-winged Teal (B)
Ruddy Duck (B)
Canada Goose (B)
Coot/Mudhen (B)
Sora Rail (B)
King Rail (B)
Black Tern (5)
Red-winged Blackbird (B)
Common Grackle (B)
Song Sparrow (B)
Common Snipe (B)
Kingfisher (V)
Swallows (V)

Mallard Duck (B)
Wood Duck (B)
Redhead Duck (B)
Mute Swan (B); (A)
Gallinule/Moorhen (B)
Virginia Rail (B)
Least Bittern (B)
Marsh Wren (B)
Yellow-headed Blackbird (B)
Swamp Sparrow (B)
Green Heron (B)
Great Blue Heron (V)
Spotted Sandpiper (V)
Swifts (V)

MAMMALS

Muskrat (B)
Skunk (V)
Raccoon (V)
Shrews (V)
Meadow Mouse (V)

Mink (V)
Opossum (V)
Fox (V)
Deer Mouse (V)
White-tailed Deer (V)

FISH

Bullhead (B)
Green Sunfish (B)
Bluntnose Minnow (B)

Stickleback (B)
Mud Minnow (B)

AMPHIBIANS

Spring Peeper (B)
American Toad (B)
Cope's Tree Frog (B)
Spotted Salamander (B)

Chorus Frog (B)
Leopard Frog (B)
Green Frog (B)

REPTILES

Water Snake (B)
Red-bellied Snake (V)
Snapping Turtle (B)

DeKay's Snake (V)
Painted Turtle (B)
Blandings Turtle (B)

(Zimmerman & Kailing, 1990)

MOLLUSCS AND CRUSTACEANS

Shrimps (B)
Fingernail Clams (B)
Water Fleas
Snails (several species (B))

INSECTS

Dragonflies (B)
Midges (B)
Water Spiders (B)
May Flies (B)
Damselflies (B)
Water Beetles (B)
Crane Flies (B)
and numerous other species

LEGEND

(A) = Alien species
(B) = Species may breed in or near marsh
(C) = (V) = Species is likely to visit marsh to feed

C-5 COMMON PEATLAND ANIMAL SPECIES IN SOUTHERN WISCONSIN

BIRDS

OPEN SEDGE

American Bittern (R)
American Kestrel (V)
Blue-winged Teal
Bobolink
Common Snipe
Great Horned Owl (V)
Harrier (R)
Killdeer Plover
Mallard Duck
Red-tailed Hawk (V)
Red-winged Blackbird
Ring-necked Pheasant (N); (W); (A)
Rough-legged Hawk (W)
Sandhili Crane
Sedge Wren (R)
Short-eared Owl (R)
Snowy Owl (W)
Sora Rail
Swamp Sparrow
Virginia Rail
Woodcock

WET SHRUB CARR

Alder Flycatcher
Black-capped Chickadee
Blue-winged Warbler
Cardinal
Catbird
Downy Woodpecker
Goldfinch
House Wren
Mourning Warbler
Northern Shrike (W)
Redstart
Tree Sparrow (W)
Veery
Willow Flycatcher
Woodcock
Yellowthroat
Yellow-breasted Chat (R)
Yellow Warbler

(Zimmerman & Kailing, 1990)

LEGEND
(A) = Alien species
(R) = Rare species
(V) = Species is likely to visit sedge meadow to feed
(W) = Winter Only

MAMMALS

A variety of mammals range widely throughout these two habitat types.
AMPHIBIANS AND REPTILES
Several amphibians as well as a number of species of snakes inhabit these two habitat types

INVERTEBRATES

These plant communities support many interesting insects, molluscs and crayfish, including several rare and handsome butterflies; orb-weaving and origami spiders, unusual crickets, katydids, springtails, ambush flies, as well as water-hunting insects such as dragonflies and several kinds of firefly beetles.

(Zimmerman & Kailing, 1990)