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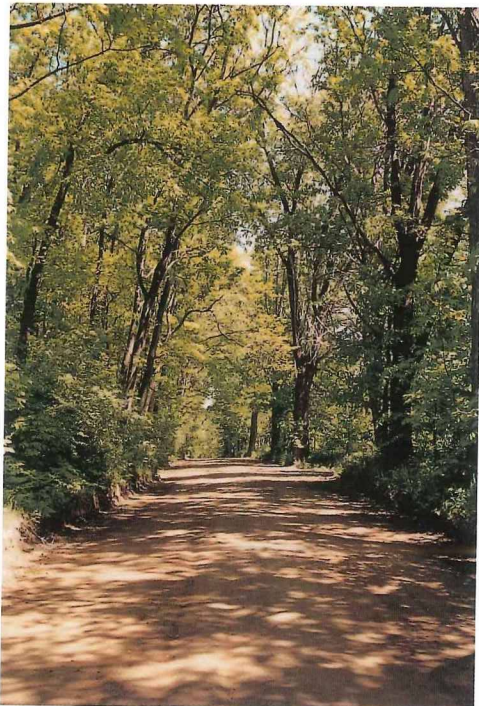
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Chapter VII. RECOMMENDATIONS, APPLICATIONS, AND LESSONS LEARNED

Recommendations and Action Checklists

The S&H Project has provided extensive information regarding existing natural resources within the project area and tools and techniques that can be used to protect these resources. This final chapter of the S&H report identifies recommendations and actions to achieve the project goals.

The chapter is divided into three sections. The first section addresses recommendations for the entire project area. The second section is devoted to three application areas that provide examples of how the project recommendations can be met at a site-specific level. Finally, the chapter concludes with a listing of lessons learned over the two and a-half years of the project.

Project Recommendations

The S&H Project encompasses approximately 180 square miles. The following eight recommendations apply to the entire project area. These recommendations are based upon the project goals, project principles, the Natural Areas Opportunities Plan identified in *Chapter IV*, and the suggested tools and techniques included in *Chapter V*. Under each recommendation are a series of action steps that are listed in a suggested sequence that may be modified. These steps provide a checklist for communities to use to monitor their progress toward the realization of project goals.

- 1.) Establish cooperative relationships and coordination at multiple levels
- 2.) Create a region-wide natural resource open space network plan
- 3.) Establish a public education and outreach program
- 4.) Establish a stewardship strategy that benefits public and private lands
- 5.) Implement tools and techniques appropriate for individual municipalities and private organizations
- 6.) Utilize natural resource-sensitive development designs
- 7.) Continue to inventory and document the natural resource system
- 8.) Continue to monitor the natural resource system

1.) Establish cooperative relationships and coordination at multiple levels

The natural systems within the S&H Project area transcend the boundaries of ownership, jurisdictional/agency responsibilities, and municipal control. These natural systems also reach beyond the study area into other local municipalities and counties. The riparian system stretches as far as Lake Erie, Saginaw Bay, and Lake St. Clair. The challenge, which is critical for the protection of the natural system, is establishing and maintaining positive, long-term working relationships between individuals and groups that often have disparate interests, goals, and responsibilities regarding natural resources.

Some of the parties that need to be involved in future cooperative relationships have been participants in the S&H Project. They include local elected and appointed officials, staff and consultant planners, developers, land conservancies, watershed councils, environmentalists, property owners, and various county and state agencies.

Principal participants and action checklist

- Local elected officials from each of the six participating communities should appoint an individual to the role of “Community Advocate” to coordinate with other communities and organizations (conservancies, watershed councils, development community, etc) to carry project recommendations forward.
- Community Advocates from the six municipalities should come together to form an Oversight Committee to facilitate an annual meeting of all interested and involved parties and organizations to discuss implementation status, successes and failures, upcoming planned activities, and status of these action checklist items.
- Local planning commissions and consultants and/or staff planners from adjacent municipalities should set regularly scheduled meetings to discuss and coordinate local plans, zoning, and development
- Local elected officials should initiate meetings with the Oakland County Drain Commission, Road Commission for Oakland County, and Planning and Economic Development Services to discuss the preparation and use of alternative road and drain design standards. This task could initiate a dialogue that would expand to include others such as planning consultants, site planners, and developers.
- Local elected officials should facilitate meetings between land conservancies, property owners, and developers to strategically target properties for conservation easements, deed restrictions, and acquisition.
- Local elected officials and staff should direct property owners to Oakland County Planning and Economic Development Services to arrange wetland consultations with the Michigan Department of Environmental Quality.
- Local municipalities and watershed councils should meet regularly to coordinate and compare water quality monitoring efforts, grant proposals, educational efforts, and identify needs. They should also explore opportunities to share technical expertise and resources.

2.) Create a region-wide natural resource open space network plan

Natural areas and ecosystems are not defined or limited by jurisdictional boundaries. In order to maintain and preserve the integrity of these areas and the natural systems that support them, it is necessary to take a comprehensive, coordinated planning approach. The Natural Areas Opportunities Plan, presented in *Chapter IV*, identifies opportunities to establish a natural resource based open space system of linked natural areas throughout the six-community project area. This plan is just a starting point. Using this plan as a framework, municipalities need to develop their own local conservation plans identifying priority resource protection areas.

Principal participants and action checklist

- Local elected and appointed officials, consultants, and staff should complete the eight step natural resource conservation planning process for their municipality, as outlined in *Chapter IV*. This process will enable the municipality to define and communicate its local vision for natural areas and systems conservation with its citizens/land owners, adjacent municipalities, interest groups, county and state agencies, and the development community.

- One component of the local conservation plan should be a natural resource greenways corridor system. Municipalities should use the natural resource greenways corridor system to encourage and provide direction for the coordination of open space developments
- Developers should use the local conservation plan when developing their site designs. The plan should have sufficient detail to help developers identify which natural features should be preserved, by application of open space planning techniques, and where to incorporate linkages to adjacent properties
- Using the local conservation plan as a guide, municipalities, agencies, and conservancies should prioritize and target key parcels for acquisition and/or conservation easements.
- Landowners should use best land management practices, such as native landscaping and resource sensitive stormwater management, to protect and enhance natural areas/systems and coordinate their efforts with neighbors to develop natural corridors throughout the neighborhood and community.
- Municipalities should coordinate their local conservation plan with adjacent municipalities to develop a region-wide natural resource open space network.
- Oakland County Planning and Economic Development Services should continue to encourage a county-wide natural resource open space network and work with municipalities to incorporate their systems into the county network.

3.) Establish a public education and outreach program

One of the most important components of the S&H Project, which will ultimately determine its success, is the ability to reach those not involved in the study. It will be important to communicate to them the value of natural resource retention and restoration. Only by having property owners, developers, and others informed will the appropriate stewardship actions outlined in this report take place. Educating landowners, government organizations, developers, and others is the responsibility of all those involved in this project. Each community should identify those individuals that can act as advocates for the project's goals and findings. As part of the S&H Project, significant efforts at education and outreach have begun through the production of a project CD, poster, and this report. In addition, key project participants have made numerous presentations at various local, regional, and state forums. Each community should institutionalize the importance of these products and their message in order to address the natural succession of people living in the area over generations to come. In the future, the continued availability of this information will be important, as well as updating and supplementing it with further studies and monitoring reports

Principal participants and action checklist

- Municipalities should define roles, identify responsibilities, and determine who will take the lead in developing an action plan for education and outreach.
- Workshops should be held for planning commissioners, consultants, and other key individuals who were not part of the S&H planning process. The purpose of the workshops will be to present the major findings and recommendations and allow participants to become involved in implementation activities.

- Local elected officials and staff should make project information available and easily accessible at government offices and other community centers, such as libraries and recreation centers.
- Land Conservancies, Watershed Councils, Parks and Recreation organizations, and other related groups should become partners in the public education and outreach program and demonstrate how the information can be used when and where appropriate
- Current and future landowners should become familiar with what natural resources exist on their property, how they relate to the surrounding landscape, and what they can do to protect and or enhance them.
- Staff planners and planning consultants should inform developers of the key findings of the study, and identify natural resource considerations that need to be incorporated into site designs, at the earliest possible stage of the site design process.
- Local elected officials and staff should provide to property owners the names of individuals and/or groups (Foresters, Natural Resource Specialists, Soil Conservation Service, etc.) that offer at no or minimal cost the service of preparing resource management plans for individual property owners.
- Local elected officials and staff should provide information on the benefits and methods of using native landscaping to property owners and developers
- Developers should share with their peers the economic and marketing benefits of incorporating open space and natural resource planning techniques in their site plan design.
- Local elected officials and staff should establish native landscaping demonstration areas at municipal offices, parks, etc
- Community Advocates should organize a committee to work with Oakland Schools and area universities on the development of a curriculum, including educational exercises, which could be used along with the CD to integrate the project into the classroom.
- A unified signage program for significant natural areas should be established throughout the project area. Cooperation between municipalities, Road Commission for Oakland County, Watershed Councils, County Planning & Economic Development Services, Parks, and Conservancies should be established. Sponsorship could be sought from Oakland County's business community.

4.) Establish a stewardship strategy that benefits public and private lands

Stewardship is the proper management of land and natural resources whether they are held by public or private landowners. Stewardship techniques include the use of native landscaping, prescribed burning, removal of invasive species, and restoration.

Stewards are individuals or entities who own the land, have primary management responsibilities, or are interested and willing to contribute their time and effort to manage land. Stewardship of the land in the S&H Project area is critical for the health of a vast ecosystem that reaches beyond the project area, to other communities, counties, and regions. Some of the S&H study participants are already dedicated stewards of the land. A stewardship program should involve all segments of the population. Every piece of property contributes to the total picture. Regardless

of the size of a parcel, people can set goals and take proper steps to preserve the natural ecosystem.

Principal participants and action checklist

- Local elected and appointed officials, staff, and consultants should develop resource management plans for all land that is held in the public trust. The plans should address habitat, forest, wetlands, grassland, and species management. An excellent reference for preparing a resource management plan is identified in *Chapter IV, Managing Michigan's Wildlife: A landowner's guide*.
- Local elected and appointed officials, staff, land conservancies, and local organizations should develop a volunteer stewardship action plan for backyard management of private land such as private property, golf courses, commercial and industrial properties, etc.

5.) Implement tools and techniques appropriate for individual municipalities and private organizations

Once local conservation plans have been developed showing natural resource priority areas, communities can determine appropriate tools and techniques. An essential element of the S&H Project is the preservation of the headwaters' natural resource system. To this end, a broad selection of planning tools and techniques (model ordinances and policy language) is offered which 1) provides the legal framework which enables and/or requires the preservation or conservation of natural resources, and 2) permits development that respects the natural limitations of the land. Literature Search Report 5.1, in the Appendix, provides an analysis of the tools and techniques used by the six participating municipalities, as of 1998, for preserving natural resources. Each individual community should compare their currently adopted measures to those tools and techniques identified in *Chapter V*. Since natural resource conditions, property ownership, and parcel fragmentation vary throughout the six communities, each community should identify those techniques that are most appropriate for their individual goals and adopt them.

Principal participants and action checklist

- Municipal planning commissions and planning consultants and/or staff planners should review *Chapter V* and Literature Search Report 5.1 to identify appropriate tools and techniques for their municipality.
- The planning commission should hold a joint meeting with the elected body to determine support for new techniques. Municipalities may wish to hold additional public information meetings to solicit support and input from citizens, developers and other interested individuals.
- Planning commissions, with help from planning consultants and/or staff planners, should modify model language of ordinances and policies in *Chapter VI* to reflect local concerns and conditions.
- The planning commission should hold public hearings on ordinance or master plan changes to gather input from citizens, developers, and other interested individuals.
- The planning commission should adopt Master Plan changes.
- Elected officials should adopt regulatory tools and techniques.

6.) Utilize natural resource-sensitive development designs

Development of the land can and should take place in ways that are respectful of natural resources and that reduce negative impacts on the environment. Site design techniques in *Chapter V* were identified specifically for their abilities to 1) preserve or conserve key natural resources, 2) permit development while respecting the natural capabilities of the land, and 3) protect and enhance property value. Utilizing these site design techniques may require communities to modify their local master plans, zoning ordinances, and other development regulations.

Principal participants and action checklist

- Municipal planning commissions and planning consultants or staff planners should review *Chapter V* and Literature Search Report 5.1 to identify appropriate natural resource-sensitive development design techniques for local application. In this review they should be receptive to creative or non-conventional development proposals that protect the natural systems
- The planning commission should hold joint meetings with elected officials to determine support for the new techniques. Communities may wish to hold additional public information meetings to solicit support and input from citizens, developers, and other interested parties.
- Municipal planning commissions and/or boards/councils should create or amend ordinances to reflect local concerns and conditions and adopt changes to their master plans and zoning ordinances.
- Municipal planning commissions, staff, consultants, and/or other local officials should educate residents and developers on the benefits of clustering, lot averaging, and other natural resource-sensitive development design techniques.
- Local elected officials should initiate meetings with the Oakland County Drain Commission, Road Commission for Oakland County, and Oakland County Planning & Economic Development Services in the preparation and use of alternative drain, road, and site design standards. This task could initiate a dialogue with other affected parties such as planning consultants, site planners, and developers.
- Developers should use natural resource-sensitive development designs, where appropriate.
- Developers should communicate to subsequent homeowners the considerations given to the natural resources during the construction of the development and identify stewardship activities for homeowners to preserve the integrity of the ecosystems.

7.) Continue to inventory and document the natural resource system

The Michigan Natural Features Inventory identified and ranked 114 sites of potential ecological significance throughout the project study area. Only eight of these sites were extensively inventoried. Through these field studies, pristine and unique habitats were discovered, including some globally rare conditions. It is conceivable that additional environmental gems exist within the study area but have not yet been discovered. Further study of those sites not inventoried, especially those that ranked the highest, should be undertaken to provide additional information on the existing conditions within the study area. The field studies provide the extensive documentation of existing resources needed to effectively manage the site.

Principal participants and action checklist

- Local elected officials, planning commissions, and professional planners should prioritize the MNFI sites for potential field inventory
- Municipal governments should locate financial resources or qualified organizations or individuals to conduct field inventories of prioritized sites
- Municipal or responsible organization staff should send out permission letters requesting access to parcels and conduct follow-up phone calls or mailings. Personal contact and follow-up with property owners may be necessary
- Individual landowners should grant permission to access their properties.

8.) Continue to monitor the natural resource system

A variety of recommendations have been identified as part of the S&H Project. It will be important to monitor activities to see what progress is being made and how action steps are being coordinated. In addition, as development occurs, it will be necessary to monitor its impact on the natural systems to ensure their continued ecological integrity.

While doing research for the project, it was discovered that comprehensive water quality data is not available. Efforts should be undertaken to collect comprehensive data on the quality and quantity of water and to establish an on-going process to monitor changes

Principal participants and action checklist

- Municipal governments should establish a process to monitor master plan changes, rezonings, site plan reviews, and development activities in order to assess their impact on the health of the natural systems. It may be useful to divide the municipality into zones, such as subwatershed districts to keep track of these changes. The Oakland County Geographic Information System and digital parcel maps could be used in the monitoring process.
- On an annual basis, each community should evaluate its progress and the status of the action checklist. Accomplishments can be shared with other communities at the annual progress meeting
- Municipal governments, watershed councils, and other groups should determine what water quality information currently exists and what is needed.
- Monitoring sites should be determined and staff or volunteers identified who can collect water samples. Results of water testing should be publicized
- Depending on results, goals should be established to either improve quality or maintain current levels
- Municipalities should explore funding sources that will allow them to continue to monitor the natural resource system

Application Areas

Three application areas were chosen to illustrate how the Natural Areas Opportunities Plan, used together with local planning principles, development policies, and applicable tools and techniques, can guide future development while effectively preserving natural resources and protecting the integrity of the local ecology. The Opportunities Plan identifies and maps the opportunities available throughout the project area for natural resource conservation. The following three applications show how the information described in the previous chapters of this report can be effectively used by local officials, developers, and property owners. The purpose of the applications is to demonstrate how the project goals can be fulfilled when following the recommended Planning Approach to Conservation Management, outlined below.

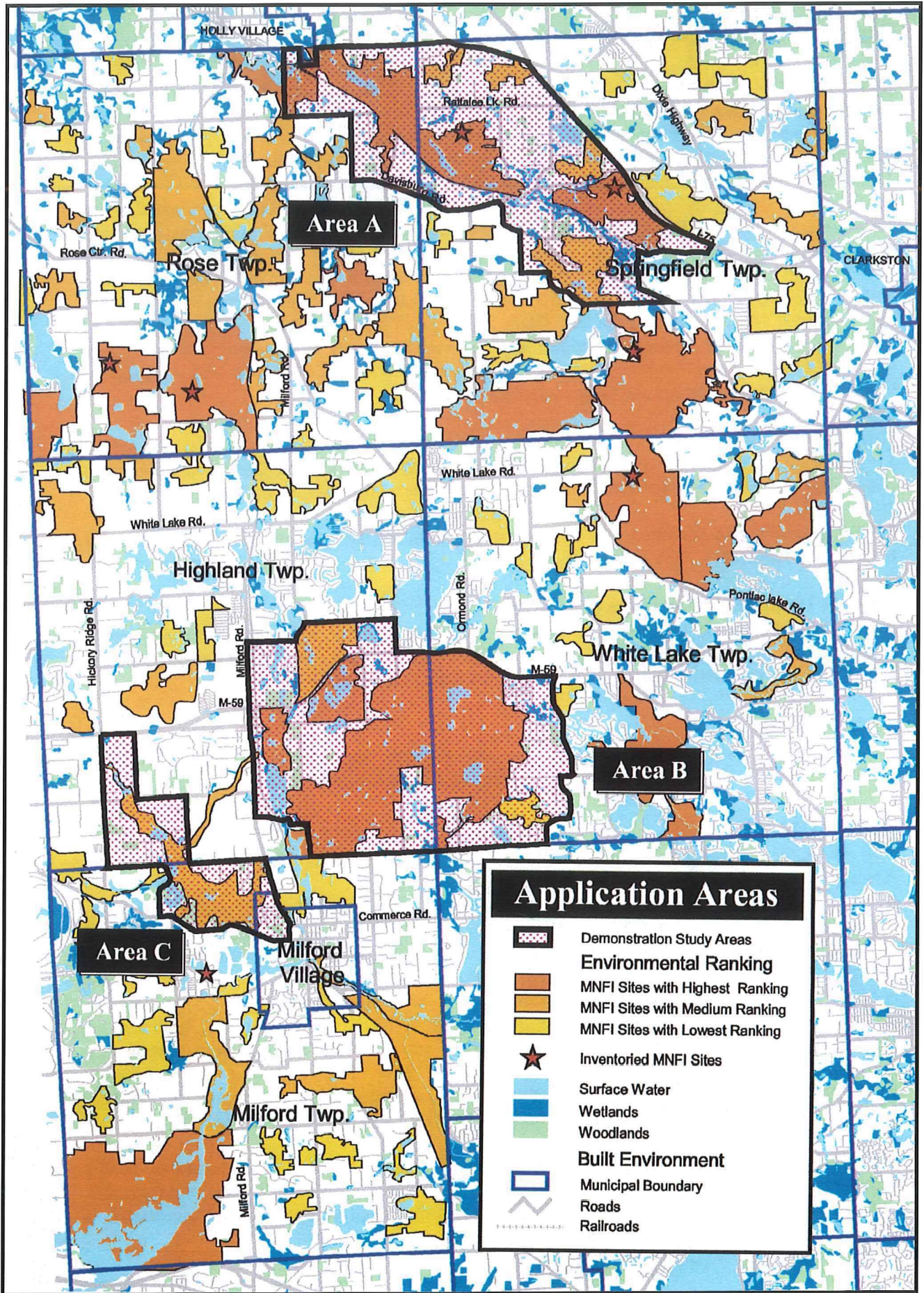
Each application study focuses on a particular Project Area Policy and identifies recommended actions to be taken to accomplish the stated objective. The focus for each application is different due to each area's uniquely different natural conditions. Each study does not identify or attempt to address all resource preservation issues that any one community will ultimately need to consider during its comprehensive planning efforts. Since the studies are all related to resource preservation, however, aspects of each have direct or indirect applicability to all six communities.

Selection of Application Areas

The following nine topics were considered in the selection of application areas.

1. **Parcel Size/Land Ownership.** Application Areas should be composed of different sizes of parcels in both public and private ownership.
2. **Interjurisdictional.** Application Areas should include land within at least two municipalities participating in the project and all municipalities should be included in at least one application area.
3. **Element Occurrence.** Application Areas should represent a diversity of natural element occurrence.
4. **Resource Intactness.** Application Areas should represent different levels of resource intactness and resource fragmentation.
5. **Riparian Corridor.** At least one Application Area should include a major riparian corridor.
6. **Landform Complex.** Application Areas should include different combinations of upland/wetland complexes.
7. **MNFI Sites.** At least one Application Area should include an MNFI inventoried site. All areas should contain MNFI sites of different size and ranking.
8. **Conservation/Preservation Opportunities.** Application Areas should offer different opportunities for demonstrating resource conservation, preservation, and/or restoration.
9. **Sewer Accessibility.** One Application Area should be considered that is in proximity to a planned future sanitary sewer service area.

Three areas were selected that met the above criteria and offered potential for applying a wide range of recommended conservation actions. Each area includes different municipal, ownership, and natural resource conditions. Therefore, they individually suggest a different primary focus for demonstrating recommendations for action. The boundaries of all three areas are generally defined by existing roads for ease of orientation and clarity of edge definition (see map on next page for locations).



Project Area Policies

Before specific recommendations can be made for the three application areas, fundamental resource conservation policies need to be established for the entire project area. These policies are considered the foundation on which decisions are based, though their priority will change from area to area due to different natural conditions and different application area emphases. Three basic policies were identified which respond to and support the project's first two stated goals, which are to "identify and conserve critical natural resources, ecosystems and habitat environments...." and "identify and develop implementation tools and techniques that conserve natural resources and create open space linkages while allowing for economically viable development." The policies are also consistent with the scientific analysis of the ecological data collected, and explained in *Chapter III*. That analysis identified "four key strategies that should be considered when developing an ecosystem approach to conservation in the project area: 1) Focus efforts on large landscape complexes, 2) Protect remaining wetlands by also managing adjacent uplands, 3) Provide connectivity via river and stream corridors, and 4) Identify opportunities for oak barrens and savanna restoration."

Riparian Corridors

1. Preserving the riparian corridors and related wetlands in their natural state, including the outer areas of the watershed which drain into and out of the wetlands is the highest priority.
2. Water quality and quantity in the headwaters area of the Shiawassee and Huron Rivers should be preserved, protected, and enhanced.

Natural Linkages or Corridor Connecting Areas

3. Remnant landscape features, such as wooded patches and tree rows, should be preserved, restored, and interconnected to create natural greenway linkages for recreational purposes, increased areas for wildlife habitat, and an overall healthy environment.

Natural Areas

4. The preservation of potentially significant natural areas identified by the Michigan Natural Features Inventory (MNFI) is essential to maintaining natural habitat and local character

Application Area 'A'

Area Description

Application Area 'A' is located in the northern part of the project area within Rose and Springfield Townships and covers approximately 12 square miles. The area includes all or part of the following nine MNFI sites: Shiawassee Lake, Springfield Woods, Eliza Lake, I-75 Woods, Holly Road, Weber Road, Long Lake, Rattalee Lake, and Mill Pond. Of these, the I-75 Woods and Long Lake sites were field inventoried and found to be of the highest ranking for their overall ecological significance. This condition was evidenced by the extensiveness of upland/wetland landform complexity, diversity of element occurrences, resource intactness, resource restorability within the sites' adjacent Secondary Boundaries, and a major riparian corridor (the Shiawassee River) extending the length of the area in an east-to-west direction. Numerous open water bodies, the most significant being Long Lake and Rattalee Lake, are also part of the river corridor.

The Rattalee Lake Natural Area, though not inventoried for this project, was studied by MNFI ecologists in 1988 through the Michigan Chapter of The Nature Conservancy (see Appendix for original survey). It was found to contain rare and special landforms, plants and animals, in a

landscape that has remained essentially unchanged for hundreds of years. The inventory revealed upland/wetland complexes similar to and integral with the overall ecological significance found at the Long Lake and I-75 Woods sites. The exceptional nature of the Rattalee Lake site subsequently inspired the Oakland Land Conservancy and the Michigan Chapter of The Nature Conservancy to jointly establish the Rattalee Lake Wetlands Area Registry. The Registry is a volunteer program formed to help landowners within the primary area of the site to identify, preserve, and protect its distinctive natural ecosystem.

The application area includes a mix of private and public land ownership, much of which are parcels twenty acres or greater in size. Given the area's high quality of environmental resources, number of remaining large parcels in private ownership, and increasing development pressures, management policies should be established that focus on acquisition of open space/conservation easements and alternative development patterns, which will assure permanent resource preservation and protection.

Primary Focus

The Long Lake site, together with the adjacent Mill Pond, Rattalee Lake, and I-75 Woods sites, form a largely undisturbed, intact and highly significant natural complex of exceptional significance. The area constitutes the headwaters of the Shiawassee River; therefore, water quality and quantity should be preserved, protected, and improved. The highest priority, therefore, should be to focus on preserving the riparian corridor and related wetlands in their natural state.

Planning Approach to Conservation Management

The riparian corridor and related high quality natural areas, combined with the amount of area that has been field inventoried and the relatively large number of undeveloped parcels twenty acres or greater in size, indicate that a regulatory and acquisition/conservation approach to resource management for the area should be undertaken. The actions listed below are recommended for consideration in the preparation of a comprehensive conservation management plan. These actions directly relate to fulfilling the objective of the area's primary focus. Local conditions will dictate where or when any one of the steps should be initiated. When a particular tool, technique, policy, or ordinance is cited, please refer to *Chapter V* and *Chapter VI* for details.

Two graphics have been prepared to generally illustrate where the following steps can be implemented. The Opportunities Plan is used as the base map for the first graphic thereby showing how the plan can be used as the framework for local conservation planning. The parcel fabric is the base map for the second graphic. Each community's parcel base will be available in a digital format through the Oakland County Geographic Information System. This format suggests one way communities can use the parcel information to monitor and track activities.

1. Establish Intergovernmental Cooperation. Since the area's natural riparian ecosystem transcends municipal boundaries, a close working relationship should be established between Rose and Springfield Townships. Protecting water quality and retaining the integrity of the riparian system will require coordination in local conservation planning and management practices between municipalities. A cooperative working relationship should begin at the planning commission level where policies are developed and joint land use concerns reviewed. A consensus needs to be reached that within the natural areas the protection of the unique wetlands, the prairie fens, is of utmost importance. Policy language should address the fact that a much larger area of influence impacts the health of the fens. This area includes the identified secondary boundaries and, also, a yet to be determined area of ground water flow.

2. Collect Baseline Data. The Long Lake and I-75 Woods sites were inventoried by the MNFI. These two sites are known to have highly significant upland/wetland ecosystem complexes within their primary boundaries. Preservation of these unique areas is directly influenced by the degree to which land resources within the sites' outer secondary boundaries are preserved and protected. In these instances, baseline information on resources, threats, and stewardship considerations is known. Particular tools and techniques related to planning support, regulatory measures, site design, and conservation/preservation can be applied to support resource protection and suggested stewardship activities.

The 1988 survey of the Rattalee Lake site did not determine the secondary boundary of influence, threats, or stewardship considerations. In order to understand the full impact on the riparian corridor ecology, several steps should be taken to collect additional information. First, those portions of the Rattalee Lake site not included in the 1988 survey should be inventoried. Second, the Shiawassee Lake site in Springfield Township and the Mill Pond site in Rose Township should be inventoried because of their immediate physical relationship to the riparian corridor. These site inventories should include a secondary boundary of influence and the identification of their respective threats and stewardship considerations.

Baseline information on the water quality and quantity of the area is also needed. A thorough understanding of the hydrology of the riparian corridor system is essential since any alteration to its natural condition is regarded by the MNFI as the greatest threat to the health of the prairie fens. Rose and Springfield Townships should, therefore, establish a cooperative mechanism for collecting and monitoring the area's hydrologic data. This could possibly be accomplished by working with the watershed council, drain commission, or volunteer programs such as Adopt-a-Stream.

3. Develop Joint Conservation Policies, Goals, and Measurable Objectives. Once baseline data is available, Rose and Springfield Townships should establish joint policies on water quality level standards for future development. Depending on the data, the municipalities could even improve water quality levels by employing Best Management Practices in their site design standards and stormwater management regulations. As stated previously, a consensus needs to be reached that within the natural areas the protection of the prairie fens is of utmost importance. Policy language should address the fact that a much larger area of influence impacts the health of the fens. This area includes the identified secondary boundaries and, also, a yet to be determined area of ground water flow. By establishing measurable objectives for the desired water quality level and through regular monitoring, both communities could see if their objectives are being met and, if necessary, adjust their policies accordingly.

4. Review Master Plans and Zoning Ordinances. In both the Long Lake and I-75 Woods Ecological Reports prepared by the MNFI, stewardship considerations within the primary boundaries state that additional development should be avoided, minimized, or designed to have minimal impact. Therefore, both townships should review their current master plans and zoning ordinances to evaluate the types and intensity of land uses planned and zoned within the primary and secondary boundaries of both sites. Changes may need to be made to land use designations or new designations developed. Particular attention should be given to those areas most likely to receive near-term development. Local planning commissions should conduct this review, with assistance from their planning consultants.

5. Adopt Tools for Resource Protection. In order to protect the integrity of the natural ecology of the riparian corridor, special restrictions for resource preservation and protection may need to be established in addition to pursuing other local initiatives. The following five

techniques are related to specific regulatory measures, site design, or conservation/preservation actions which, when applied individually or collectively, will contribute much in achieving resource protection.

a. Adopt Overlay Districts. Overlay Districts are one approach to applying special restrictions to areas with unique conditions. Properties included within these districts would retain their underlying zoning classification but would be subject to additional requirements specified in the overlay district ordinance. Model language for an overlay district is presented in *Chapter VI*. Both Rose and Springfield Townships would be more successful in meeting the objective of resource preservation if they adopt the same or similar overlay district ordinance.

In preparing an overlay district, it is first necessary to identify the geographic limits of the areas to be included. This involves clearly stating the purpose for creating a district as well as reflecting established local preservation policies. It is recommended that the riparian corridors be part of the district, which means all land area within a certain distance from the river's edge would be subject to additional restrictions. This distance, or width, would need to be defined based on topography and/or other hydrologic criteria.

Depending on either community's purpose in adopting an overlay district, they may or may not include all nine MNFI identified natural areas, regardless of their ecological ranking. The adoption of an overlay district accomplishes three objectives. It 1) requires all parcels within the district to be inventoried, although this is done one parcel at a time, 2) alerts a developer of the site's potentially significant resources and that it would be subject to special restrictions; and 3) allows the community to identify those priority protection areas on a site that a developer must refrain from developing or develop with minimal site disturbance.

Potential development of a particular site is what triggers the required inventory. Under an overlay zone, sites will get inventoried but it will be in a piecemeal fashion. Therefore, the full ecological significance of a parcel in relationship to its surroundings may not be evident. This is why neither municipality should rely exclusively on an overlay district to have potentially significant sites inventoried. The conservation approach outlined in this application recommends that sites be prioritized for inventory, so as money is made available for a full ecological field study, priorities will have been established and permission granted by property owners for site access.

b. Pursue the Acquisition of Open Space/Conservation Easements. Some of the prairie fens and other highly diverse habitats within the riparian corridor are on parcels in private ownership. Due to the fragile nature of these resources, regulatory techniques may not be adequate to protect their ecological integrity. For select private parcels containing a highly sensitive resource, such as a prairie fen, the outright purchase of land or conservation easements will be necessary for their permanent protection. By managing these unique, natural wetland areas, Rose and Springfield Townships can better ensure improved water quality and protection from future development.

c. Encourage Open Space/Cluster Design and Lot Averaging. If Rose and Springfield Townships adopt an overlay district, they should also adopt other tools and techniques for developers to use, such as open space/cluster design and lot averaging. These tools allow the permitted density while providing flexibility in lot sizes and layouts, which preserves the valued natural resources. Parcels twenty acres or greater are particularly well suited to using these site design techniques.

d. Encourage Native Landscaping. The use of native landscaping is a tool for improving water quality by reducing stormwater runoff, soil erosion, and the use of chemical-based fertilizers and pesticides. Coordinating the amount, type, and location of native landscaping between private property owners can also result in creating significant natural buffers to adjacent protected natural areas, providing linkages between preserved open space areas, avoiding fragmentation of key resources, and providing a greater critical mass of wildlife habitat. The use of native landscaping should be encouraged within this application area as well as project-wide.

e. Implement Stormwater Management/Impervious Surface Regulations. Establishing a stormwater management plan, including related development regulations and site plan review procedures, is an effective method of preventing flooding and maintaining habitat and water quality. Regulatory considerations can also be a mechanism for identifying natural features to be protected. A stormwater management plan addresses topics characteristic to natural drainage, site runoff, erosion and sedimentation, condition of water resources, soils, slopes, detention areas, and strategies for handling future development concerns related to the amount, type, and location of impervious surfaces. Coordination between Rose and Springfield Townships will be important since they share common drainage districts. Working together for the purpose of addressing the issues of flooding and water quality could result in benefits to both communities by adopting the same strategy and language in their individual plans, regulations, and/or ordinances.

6. Perform Stewardship Activities. The stewardship of land resources is both a public obligation and a private landowner's responsibility. Public officials are the stewards of publicly owned land and are in the position to identify, activate, and coordinate help from local nature associations, environmental groups, civic organizations, youth groups, schools, developers, homeowner associations, and volunteers in their efforts to preserve and protect natural resources. Within this application area, the I-75 Woods and Long Lake natural areas were inventoried by the MNFI and appropriate stewardship considerations identified within their primary and secondary boundaries. These stewardship activities could also likely be applied to the other MNFI Natural Areas after being surveyed. They might be performed now, but only as recommended by and under the supervision of a qualified ecologist. Private land owners within these natural areas are also encouraged to be good stewards of their property by also performing the following supervised activities:

a. Prescribed Burning. Prescribed burning is recommended in the MNFI Ecological Reports for the purpose of forest regeneration and the control of invasive and exotic plant species. It is also recommended to be a part of a conservation management plan for the area. This technique should be used only in specific areas of the wetland/upland complex, such as low meadow lands and old fields, along the railroad right-of-way, and within the powerline easement. Burning should only be executed during the early spring or late fall of each year, undertaken in a coordinated manner, and with required approvals for fire control and safety. Appropriate sites for prescribed burning should be determined by a qualified ecologist as well as the particular burning technique to be used. Advanced permission from property owners and coordination with and approval by the local fire department will be required.

b. Removal of Invasive Species. The physical removal of invasive plant species in all identified natural areas is recommended in the MNFI Site Ecological Reports for the purpose of protecting the integrity of the existing natural ecology. Annual plant removal and monitoring programs can be organized and coordinated by qualified botanists using

volunteers such as local citizen interest groups, civic organizations, the Boy/Girl Scouts of America, or area nature associations/ conservancies

c. Restore Native Vegetation. The use of native landscaping and vegetation is recommended in areas of the riparian corridor that have been degraded. Restoring the riverbanks, streambanks, and related wetlands with native vegetation will help to stabilize the local ecosystem and protect water quality

Application Area “A”
Summary of Key Actions and Areas of Responsibility








<u>ACTIONS</u>		Municipal Officials	Municipal Planning Commission(s)	Planning Consultant / Staff	Developers	Property Owners/Residents	Watershed Councils	Land Conservancies	Community Advocate	Others
1.	Establish Interjurisdictional Cooperation	●	●	○		○			○	
2.	Collect Baseline Data	●		○		●	○			E, L, I
3.	Develop Joint Conservation Policies, Goals, and Measurable Objectives	●	●	○			○			
4.	Review Master Plans and Zoning Ordinances	●	●	●	○	○				
5	Adopt Tools for Resource Protection									
a.	Adopt Overlay District	●	●	○		○				
b.	Pursue the Acquisition of Open Space / Conservation Easements	●	○	○	○	○		●	●	A, B, G
c.	Encourage Open Space / Cluster Design and Lot Averaging	●	●	●	○	○				H
d.	Encourage Native Landscaping	●	●	●	●	○	○	○	●	E, H, K
e.	Implement Stormwater Management / Impervious Surface Regulations	●	●	●	○	○	○			E
6.	Perform Stewardship Activities									
a.	Prescribed Burning	●			○	●		○	○	I, J, L
b.	Removal of Invasive Species			○	○	●		●	●	D, I
c.	Restore Native Vegetation	●	●	●	○	●	○	●	●	I, L

Others:

- A Huron Clinton Metropolitan Authority
- B MI Department of Natural Resources
- C MI Department of Transportation
- D MI State University Cooperative Extension
- E Oakland County Drain Commission
- F Oakland County Health Department
- G Oakland County Parks & Recreation Commission
- H Oakland County Planning & Economic Development Services
- I Resource Inventory Agency such as MNFI
- J Public Safety Officials
- K Road Commission for Oakland County
- L Volunteers

● Primary / Lead Role
○ Secondary / Support Role

Application Area 'A'

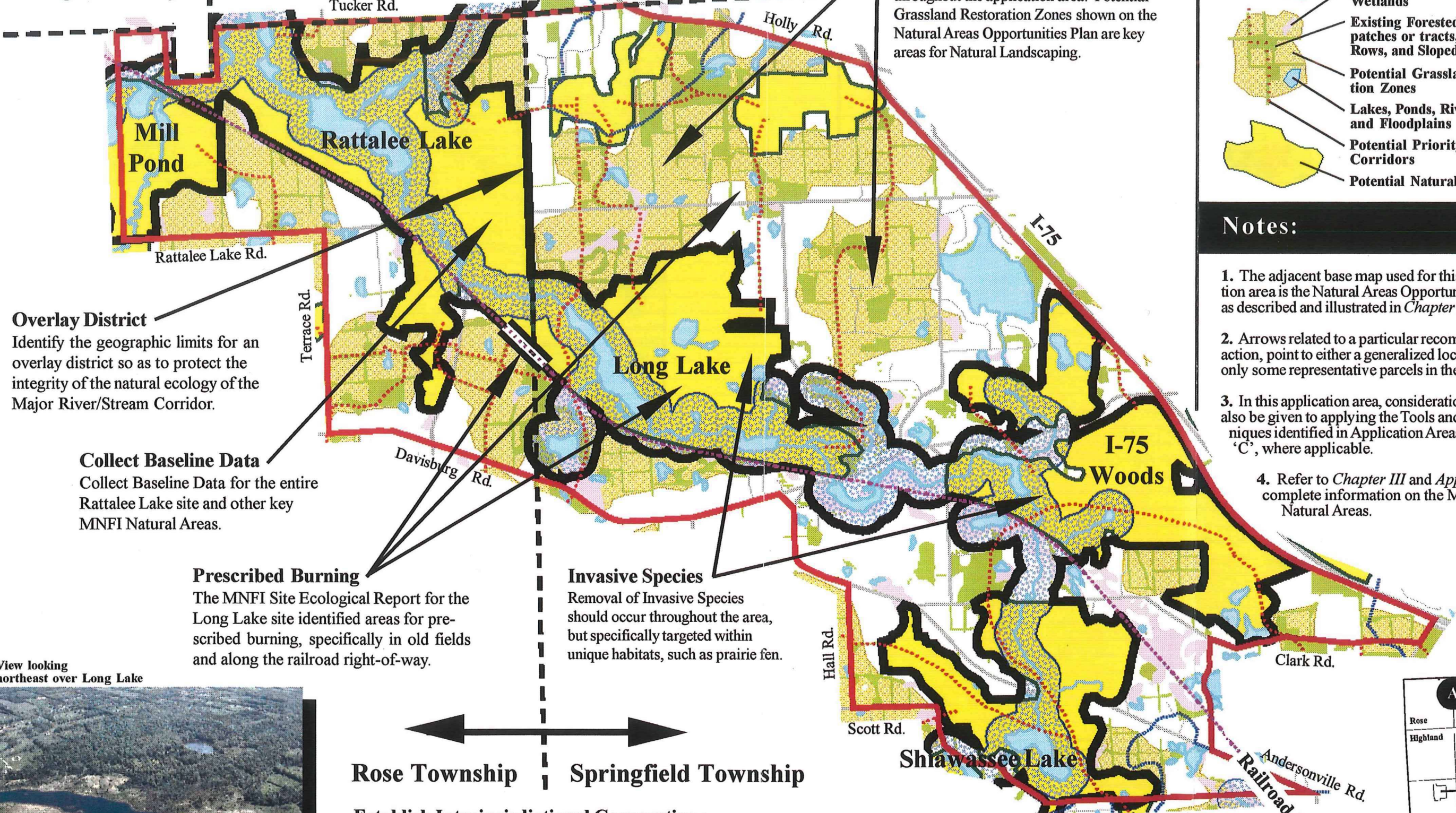
-  Major River/Stream Corridors
-  Forested and Non-Forested Wetlands
-  Existing Forested upland patches or tracts, Tree/Hedge Rows, and Sloped Lands
-  Potential Grassland Restoration Zones
-  Lakes, Ponds, Rivers, Streams, and Floodplains
-  Potential Priority Wildlife Corridors
-  Potential Natural Areas

Notes:

1. The adjacent base map used for this application area is the Natural Areas Opportunities Plan as described and illustrated in *Chapter IV*.
2. Arrows related to a particular recommended action, point to either a generalized location or only some representative parcels in the area.
3. In this application area, consideration should also be given to applying the Tools and Techniques identified in Application Areas 'B' and 'C', where applicable.
4. Refer to *Chapter III* and *Appendix* for complete information on the MNFI Natural Areas.

Natural Landscaping
Natural Landscaping should be encouraged throughout the application area. Potential Grassland Restoration Zones shown on the Natural Areas Opportunities Plan are key areas for Natural Landscaping.

Village of Holly
Holly Township
Groveland Township



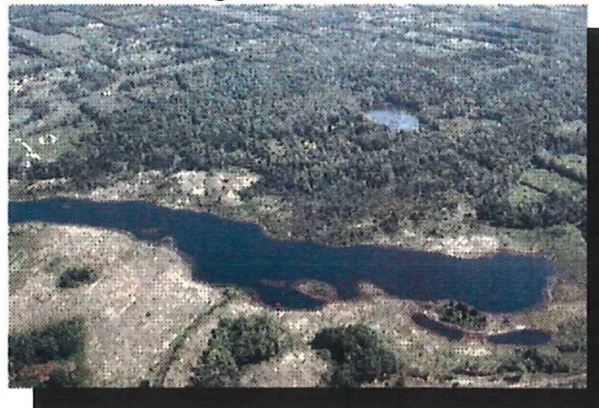
Overlay District
Identify the geographic limits for an overlay district so as to protect the integrity of the natural ecology of the Major River/Stream Corridor.

Collect Baseline Data
Collect Baseline Data for the entire Rattalee Lake site and other key MNFI Natural Areas.

Prescribed Burning
The MNFI Site Ecological Report for the Long Lake site identified areas for prescribed burning, specifically in old fields and along the railroad right-of-way.

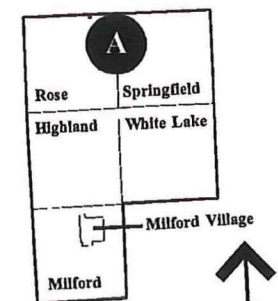
Invasive Species
Removal of Invasive Species should occur throughout the area, but specifically targeted within unique habitats, such as prairie fen.

View looking northeast over Long Lake



Rose Township
Springfield Township

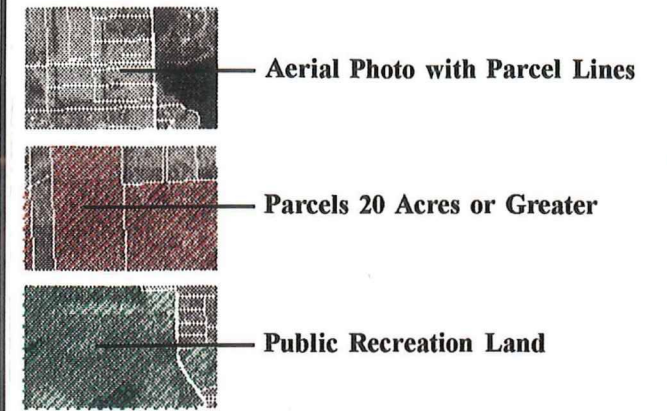
**Establish Interjurisdictional Cooperation ;
Develop Joint Conservation Policies, Goals and Measurable Objectives; and
Review Master Plans and Zoning Ordinances**
for local conservation planning and management practices.



Location Key

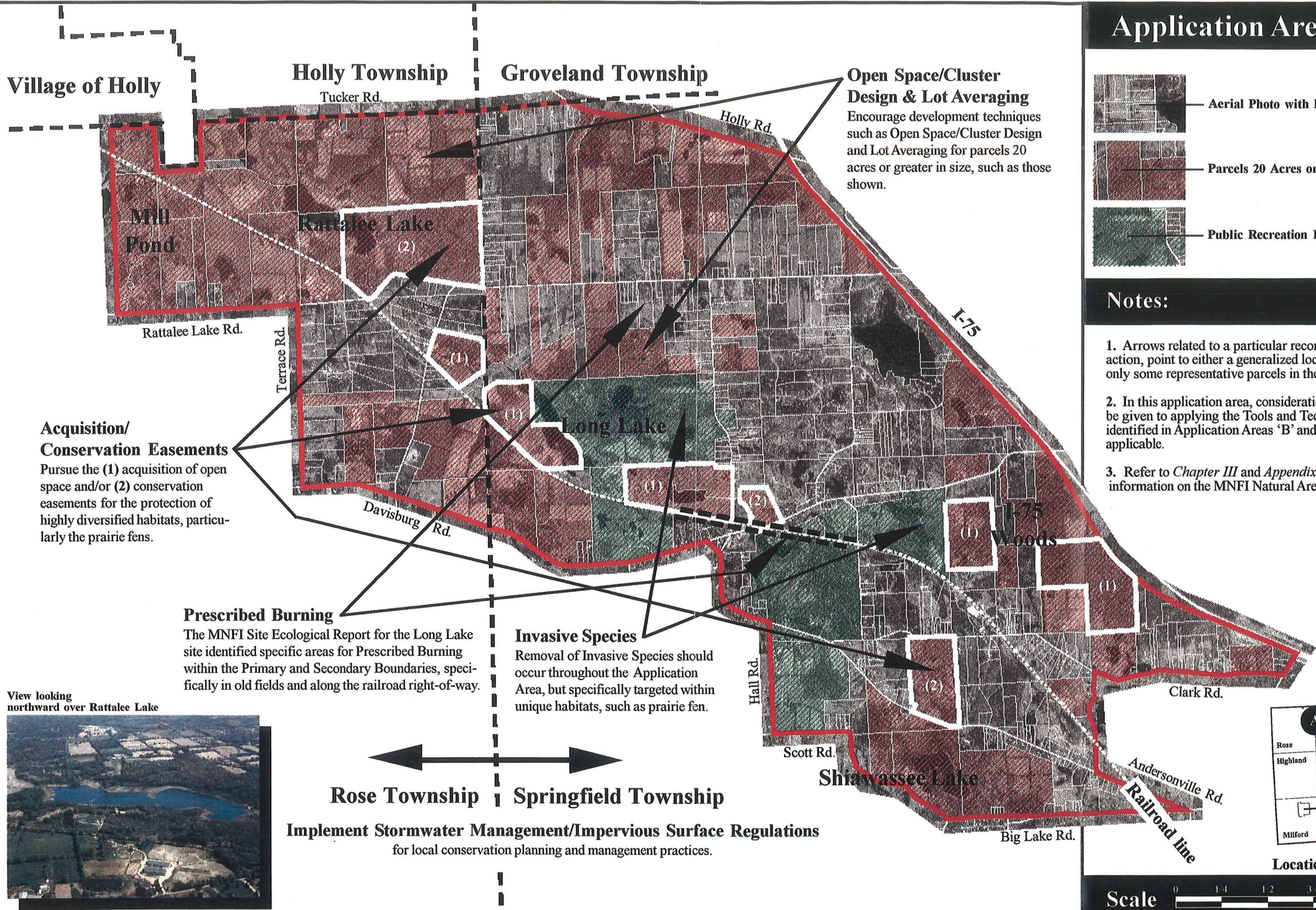


Application Area 'A'



Notes:

1. Arrows related to a particular recommended action, point to either a generalized location or only some representative parcels in the area.
2. In this application area, consideration should also be given to applying the Tools and Techniques identified in Application Areas 'B' and 'C', where applicable.
3. Refer to *Chapter III* and *Appendix* for complete information on the MNFI Natural Areas.



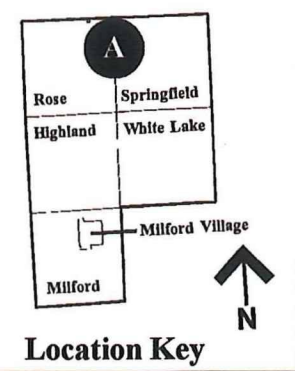
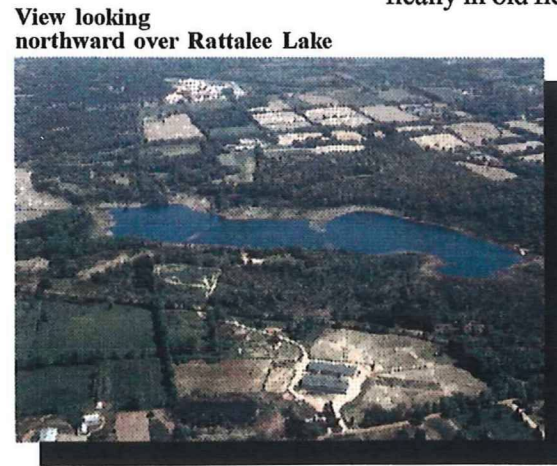
Open Space/Cluster Design & Lot Averaging
Encourage development techniques such as Open Space/Cluster Design and Lot Averaging for parcels 20 acres or greater in size, such as those shown.

Acquisition/ Conservation Easements
Pursue the (1) acquisition of open space and/or (2) conservation easements for the protection of highly diversified habitats, particularly the prairie fens.

Prescribed Burning
The MNFI Site Ecological Report for the Long Lake site identified specific areas for Prescribed Burning within the Primary and Secondary Boundaries, specifically in old fields and along the railroad right-of-way.

Invasive Species
Removal of Invasive Species should occur throughout the Application Area, but specifically targeted within unique habitats, such as prairie fen.

Implement Stormwater Management/Impervious Surface Regulations
for local conservation planning and management practices.



APPLICATION AREA 'B'

Area Description

Application Area 'B' is located in the south/central part of the project area within Highland and White Lake Townships and covers approximately 14 square miles. The area includes all or part of the following six MNFI sites. Haven Hill Complex East, Haven Hill Complex West, Pettibone Lake Complex, Aldeman Lake Complex, Section 32 Tamaracks; and Waterbury Lake Complex. The area is dominated by a large, publicly owned park, the Highland Lake State Recreation Area. A portion of the park was inventoried in 1976 and found to have a very high degree of resource intactness and an extensive upland/wetland complex, which resulted in it being designated a National Natural Landmark. Three riparian corridors and their headwaters exist within the area, each within a different subwatershed. Outside the state park to the south, east, and west, the land is in private ownership and mostly developed as single-family residential with a minimum allowable lot size of between .25-2.5 acres. There are, however, numerous vacant parcels in the area greater than twenty acres in size. With the exception of the land within the state park and all of the MNFI sites, the balance of the area can be characterized as having an upland fragmented landscape with medium potential for restoration.

Primary Focus

This application area is dominated by the Highland Lake State Recreation Area (HLSRA), a large, highly significant natural area that is publicly owned and with a conservation management plan in effect. The focus of this application is the conservation of the state parkland, including the protection of its perimeter from the negative impacts associated with neighboring private development.

Planning Approach to Conservation Management

The preservation and protection of the Highland Lake State Recreation Area suggests a combined regulatory and voluntary approach to resource management should be undertaken. The management plan should address issues such as: the number of adjacent natural areas that have not been field inventoried, the number of private parcels within the park boundaries, the number and size of adjacent undeveloped parcels, the park's proximity to Highland Center to the west, its adjacency to a planned potential future sewer service area to the east in White Lake Township, and its relationship to the Highland Road/M59 corridor to the north. The actions listed below are recommended for consideration in the preparation of a comprehensive conservation management plan since they directly relate to fulfilling the objective of the area's primary focus. Local conditions will dictate when any one of the actions should be initiated. When a particular tool, technique, policy, or ordinance is cited, please refer to *Chapter V* and *Chapter VI* for details.

Two graphics have been prepared to generally illustrate where the following actions can be implemented. The Opportunities Plan is used as the base map for the first graphic thereby showing how the plan can be used as the framework for local conservation planning. The parcel fabric is the base map for the second graphic. Each community's parcel base will be available in a digital format through the Oakland County Geographic Information System. This format suggests one way communities can use the parcel information to monitor and track activities.

1. Establish Intergovernmental Cooperation. Since the Highland Lake State Recreation Area and its natural ecosystems transcend property boundaries, a close working relationship in the coordination of conservation planning and management practices should be established between Highland and White Lake Townships and the State of Michigan. Steps for protecting water quality and retaining the overall integrity of the area's natural ecosystems, particularly within

Highland Lake State Recreation Area, should be initiated by the Townships' elected officials. Preparing a resource management strategy should begin by local officials working with the Department of Natural Resources, but planning and regulatory actions should be delegated to the local planning commissions where policies are developed and land use concerns reviewed.

2. Review Parks and Recreation Plan. Haven Hill State Natural Area, a 546-acre tract located within the 5,402-acre Highland Lake State Recreation Area, is one of 587 nationally significant sites designated as a National Natural Landmark (NNL) by the Secretary of the Interior. To receive NNL designation, "a site must be one of the best examples of a type of biotic community or geologic feature in its physiographic province" A goal of the NNL program is "to identify, recognize, and encourage the protection of sites containing the best remaining examples of ecological and geological components of the nation's landscape"

a. Form Study Committee. Consistent with the above NNL program goal, the park's current policies and management plan should be reviewed so specific environmental threats and associated stewardship considerations can be identified and acted upon. This review could be done by a special study committee represented by the MI Department of Natural Resources (MDNR), members of the Highland and White Lake Township Planning Commissions, and other interested parties such as, but not limited to, Save Haven Hill, Inc This committee can play a vital role in reviewing programs and activities that impact the park's ecology, its boundaries, and immediate surrounding areas. Following are some possible concerns that should be addressed in the review of the park's management plan and recommendations made:

1. Pursue Acquisition and Open Space/Conservation Easements. Acquisition by the State of "keyhole" parcels or those private properties isolated within the park's boundaries requiring access through the park.

2. Encourage Native Landscaping. In an effort to preserve and protect the integrity of the natural ecology of Highland Lake State Recreation Area (HLSRA), it is recommended that private landowners on parcels abutting the park use native landscaping as a buffer along the park boundary. Property owners should work together and organize themselves for the purpose of sharing ideas and combining efforts. The objective would be to prepare a strategy, or plan of action, for developing a unified approach to native landscape management.

A native landscaping program should also be implemented along the Highland Road/M59 corridor. The landscaping program should produce a visually unified character along the corridor giving a distinctive identity to the park. Standards should be established for the appropriate application of plant materials, identification signs, lighting, and elevated power lines along the corridor right-of-way and within the center median. A similar native landscaping program should also be incorporated at the new Highland Township Civic Center site where municipal property borders both the park and Highland Road/M59 corridor. These activities should be coordinated with Step 7, Implement a Landscape and Tree Planting Program.

3. Explore Opportunities for Stewardship and Promotion of the Haven Hill State Natural Area (HHSNA). Since the HHSNA is part of the HLSRA, as well as being a designated National Natural Landmark (NNL), the Study Committee should develop a strategy for its stewardship and promotion and be incorporated into the park's management plan. Opportunities exist for establishing recreational linkages within and

beyond the park (see *Chapter IV Natural Areas Opportunities Plan*). Establishing linkages that would connect major destinations such as historic Highland Center to the west, East Highland to the east, and Milford Village to the south would be appropriate for consideration and perhaps be the basis for preparing an area-wide greenway plan. Local historical and cultural attractions in the area should be identified and, wherever possible, included within a recreation linkage plan. Developing recreational linkages such as this would increase public exposure to the HHSNA and be a reason for developing a targeted promotional/educational program through the HLSRA. (See *Application Area 'A', Action 6: Perform Stewardship Activities*).

b. Encourage Open Space/Cluster Design and Lot Averaging. Highland and White Lake Townships should adopt Tools and Techniques for developers to use such as Open Space/Cluster Design and Lot Averaging. These tools allow the permitted density while providing flexibility in lot sizes and layouts, which preserves the valued natural resources. Parcels twenty acres or greater are particularly well suited to using these site design techniques.

3. Collect Baseline Data. This application area includes all or part of six identified MNFI Natural Areas, none of which have been inventoried except for a portion of the Pettibone Lake Complex and that portion of the Haven Hill Complex East having National Natural Landmark designation. A mechanism should be identified for funding the inventories of all the areas, including the balance of the Pettibone Lake and both Haven Hill sites. Since all the identified MNFI sites are mostly on state owned land, the MI Department of Natural Resources should be encouraged to work through their park naturalist to do these site inventories. All the site studies should include a secondary boundary of influence and the identification of their respective ecological threats and stewardship considerations.

4. Review Master Plans and Zoning Ordinances. In addition to six identified MNFI natural areas, the headwaters of three riparian corridors exist within the application area. As additional baseline data is obtained, both Highland and White Lake Townships should compare this information to their current master plans and zoning ordinances. In doing so, they may wish to reconsider the types and intensity of land uses planned and zoned for private parcels adjacent to the park, yet within a primary or secondary boundary of an MNFI Natural Area. Changes may need to be made to land use designations or new designations developed. Particular attention should be given to those areas most likely to receive near-term development and which most directly impact the integrity of Highland Lake State Recreation Area's natural ecology. Both townships' planning commissions should conduct this review, with assistance from their planning consultants. Consideration should also be given to the proposed sewer service area planned for White Lake Township immediately east of the application area. Transfer of Development Rights (TDR) is a planning tool that should also be investigated as a means of reducing the intensity of development adjacent to the HLSRA park.

The existing development pattern of Highland Center suggests that the Highland Township Master Plan be amended to call for increased density and mixed use development within the Center. Correspondingly, a reduction of development intensity should be considered in areas adjacent to the Highland Lake Recreation Area.

5. Develop Joint Conservation Policies, Goals, and Measurable Objectives. Officials from Highland and White Lake Townships and the MDNR can play an important role in encouraging broad-based citizen participation in reviewing and providing input in updating the state park's policies and management plan. This process should involve coordination between the park's

planning activities and the townships' comprehensive planning efforts so conservation/preservation policies and goals are mutually supportive

Once baseline data is available (see Step 3), Highland and White Lake Townships and the MDNR should establish joint policies on water quality standards. Depending on the data, water quality levels could even be improved by 1) the municipalities employing Best Practices in their site design and stormwater regulations, and 2) the DNR employing Best Practices in determining the appropriate type, amount, location, and frequency of recreation uses. By establishing measurable objectives for the desired water quality level and by regularly monitoring, both communities and the DNR could see if their objectives are being met and, if necessary, adjust their policies accordingly.

6. Consider Additional Planning Tools and Techniques. Considering the proximity of Highland Lake State Recreation Area to historic Highland Center, particular attention should be given to the preservation and protection of both natural and man-made resources. These considerations should be incorporated in the review of the Township's Master Plan and Zoning Ordinance. The following planning tools can contribute to fulfilling this objective and result in a harmonious, healthy interrelationship between the natural and man-made conditions.

a. Establish a Downtown Development Authority (DDA). Highland Township is currently in the process of forming a Downtown Development Authority for the historic Highland Center area. This legislation was created for the purpose of establishing an organizational framework to guide development/redevelopment within a defined downtown business district and providing a funding mechanism for implementing projects. Funding tools include millage (2 mill max) and Tax Increment Financing. Establishing a DDA, following the intent of the legislation, will create incentives for business development within the DDA district, thereby strengthening its physical identity. Coordination between the DDA plan and the Township's Master Plan and Zoning Ordinance will be required.

b. Adopt a Traditional Neighborhood Development Ordinance (TND). Once the Master Plan identifies Highland Center as a town center, the Township should consider adopting a Traditional Neighborhood Development ordinance. The TND can be implemented either as an option to the existing township zoning ordinance or by creating an overlay district. Within an overlay district, properties would retain their underlying zoning classification, but would be subject to added restrictions. For an established historic center, the TND ordinance would respect local historic planning traditions. Using the added techniques of Infill Development and Transfer of Development Rights, Highland Center could become more of a pedestrian-friendly environment, offering a mix of land uses and higher density development, and strengthening natural edges to define the area's physical identity. The TND ordinance gives developers an alternative development tool that would likely lessen the negative impact on the surrounding natural environment. See *Chapter V* of this document for further explanation of these tools.

7. Implement a Landscape and Tree Planting Program. This program can be applied area-wide, though three conditions in particular have been identified in this application area that should be addressed within the townships' zoning ordinances. They are the Highland Road/M59 corridor, the residential streets adjacent to the Highland Lake State Recreation Area, and within the more urban area characterizing Highland Center.

The Highland Road/M59 right-of-way should be appropriately landscaped. Presently, it is virtually treeless and does not complement the unique natural character of the Highland Lake

State Recreation Area bordering the roadway. Highland and White Lake Townships should jointly work with the MI Department of Natural Resources and the MI Department of Transportation (MDOT) and prepare a tree planting and preservation plan for obtaining funds to implement the program using the MDOT Transportation Equity Act for the 21st Century (TEA-21). This project should be coordinated with Action 2 a.2. Encourage Natural Landscaping.

Existing local streets should be surveyed to determine the area's original natural character and a tree planting and preservation program enacted to appropriately repair damaged or weakened conditions. A street tree planting and preservation program should be initiated by both townships and funded by a combination of means, including the local government's general fund, increased property assessments, and environmental programs such as Global ReLEAF. In some instances, residents should be encouraged to protect the existing character of their street by petitioning the Road Commission for Oakland County to have their street designated a local Natural Beauty Road.

Highland Center has traditional neighborhood qualities characterized by smaller lot sizes, varied uses, and a grid street pattern. Street trees are an important element in the design of this type of urban landscape. Over the years, the original trees have matured and many have died without being replaced. Consequently, the physical character of the area has been negatively impacted. Highland Township should institute a tree replacement and preservation program for the Highland Center area, using similar funding mechanisms as those listed above.

The benefits derived from the planting and preservation of street trees can be summarized by: 1) softening the immediate environment with their green foliage; 2) reducing pollution by removing airborne dust and particulate matter, 3) reducing the greenhouse effect by removing carbon dioxide; 4) cooling air temperatures in the summer by shading people, buildings, streets and sidewalks; 5) soothing people's spirits with their natural beauty; 6) elevating property values by enhancing neighborhood appearance; 7) providing habitat for birds and wildlife; and 8) increasing neighborhood pride. Landscape and tree planting programs need to be coordinated by and between township officials and their respective planning commissions.

Application Area “B”

Summary of Key Actions and Areas of Responsibility

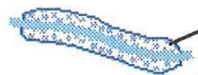






<u>ACTIONS</u>		Municipal Officials	Municipal Planning Commission(s)	Planning Consultant / Staff	Developers	Property Owners/Residents	Watershed Councils	Land Conservancies	Community Advocate	Others
1	Establish Intergovernmental Cooperation	●	●	○		○			○	B
2.	Review Parks and Recreation Plan Form Study Committee	●	●	○		○			○	B
a.1	Pursue Acquisition and Open Space / Conservation Easements	●	○	○		○			●	B
a.2	Encourage Natural Landscaping	●	●	●	○	○		○	●	B, C, E, H, K
a.3	Explore Opportunities for Stewardship and Promotion of the Haven Hill State Natural Area	●	●	○		●		○	●	B, H, L
b.	Encourage Open Space / Cluster Design and Lot Averaging	●	●	●	○	○				F, H
3.	Collect Baseline Data	●		○		●	○			B, L, I
4.	Review Master Plans and Zoning Ordinances	●	●	●	○	○				
5.	Develop Joint Conservation Policies, Goals and Measurable Objectives	●	●	○						B
6	Consider Additional Planning Tools and Techniques for Consideration									
a.	Establish a Downtown Development Authority	●	●	○		●				H
b.	Adopt a Traditional Neighborhood Development Ordinance	●	●	●		○				H
7.	Implement Landscape & Tree Planting Program	●	●	○	●	●			○	B, C, K,

Others:

- | | |
|--|---------------------------------------|
| A. Huron Clinton Metropolitan Authority | I. Resource Agency such as MNFI |
| B. MI Department of Natural Resources | J. Public Safety |
| C. MI Department of Transportation | K. Road Commission for Oakland County |
| D. MI State University Cooperative Extension | L. Volunteers |
| E. Oakland County Drain Commission | |
| F. Oakland County Health Department | |
| G. Oakland County Parks & Recreation | |
| H. Oakland County Planning & Economic Development Services | |

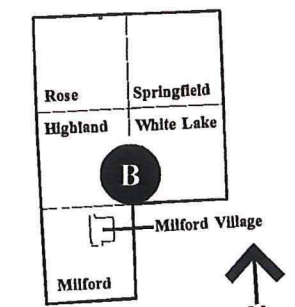
● Primary / Lead Role
○ Secondary / Support Role

Application Area 'B'

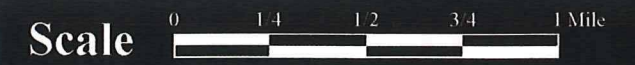
-  Major River/Stream Corridors
-  Forested and Non-Forested Wetlands
-  Existing Forested upland patches or tracts, Tree/Hedge Rows, and Sloped Lands
-  Potential Grassland Restoration Zones
-  Lakes, Ponds, Rivers, Streams, and Floodplains
-  Potential Priority Wildlife Corridors
-  Potential Natural Areas

Notes:

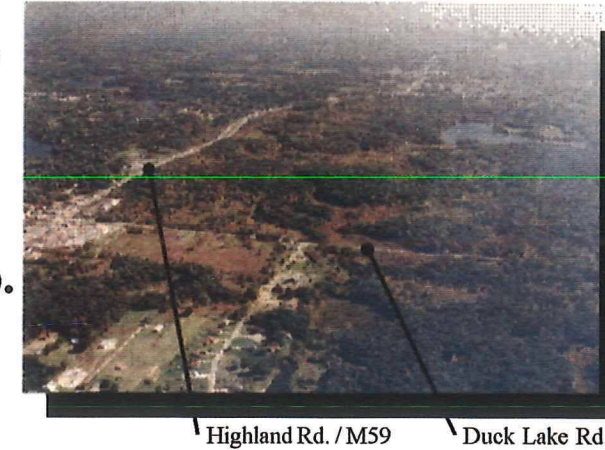
1. The adjacent base map for this application area is the Natural Areas Opportunities Plan as described and illustrated in *Chapter IV*.
2. Arrows related to a particular recommended action, point to either a generalized location or only some representative parcels in the area.
3. In this application area, consideration should also be given to applying the Tools and Techniques identified in Application Areas 'A' and 'C', where applicable.
4. Refer to *Chapter III* and *Appendix* for complete information on the MNFI Natural Areas.



Location Key



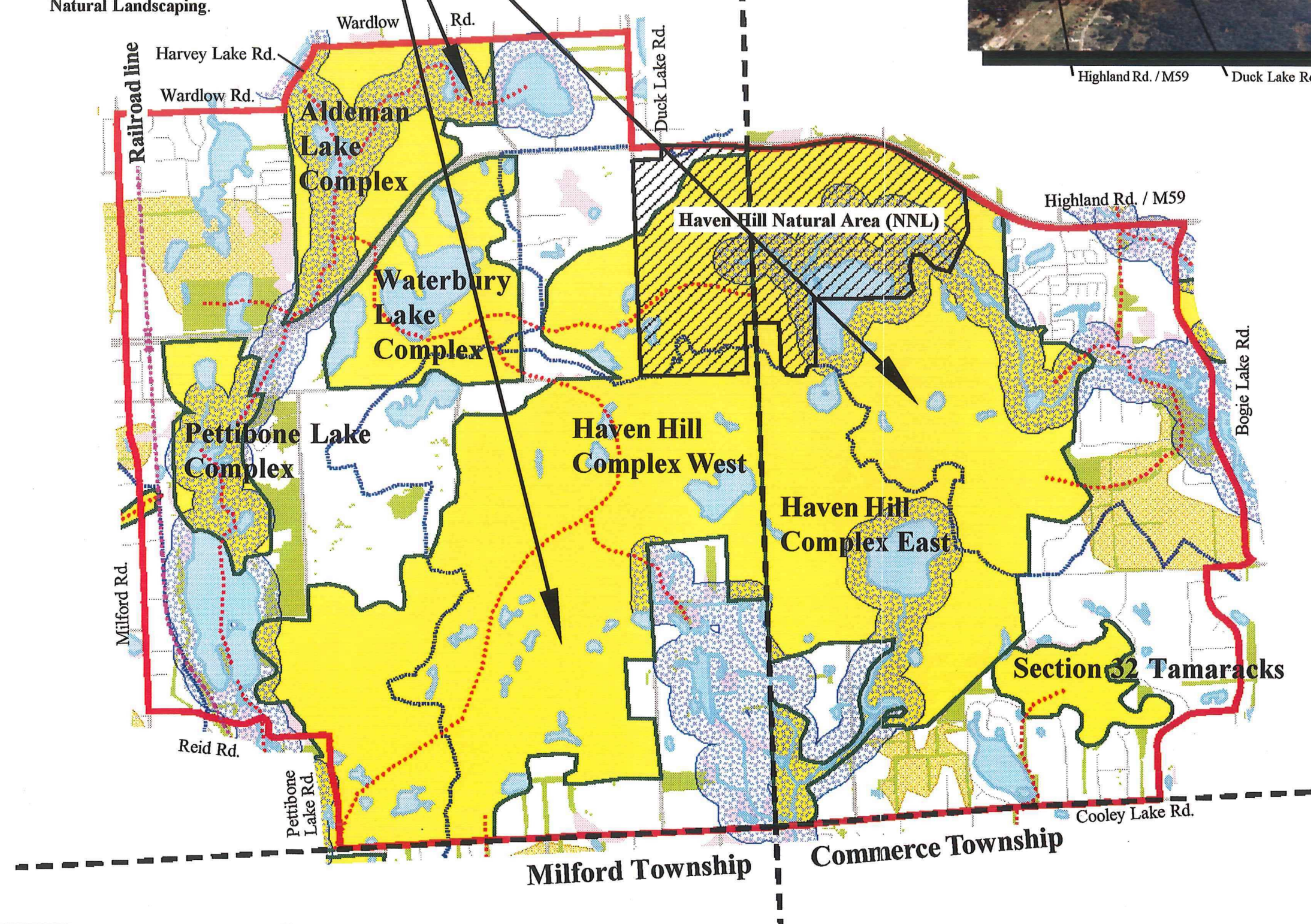
View looking east toward Haven Hill Complex East and Haven Hill Complex West



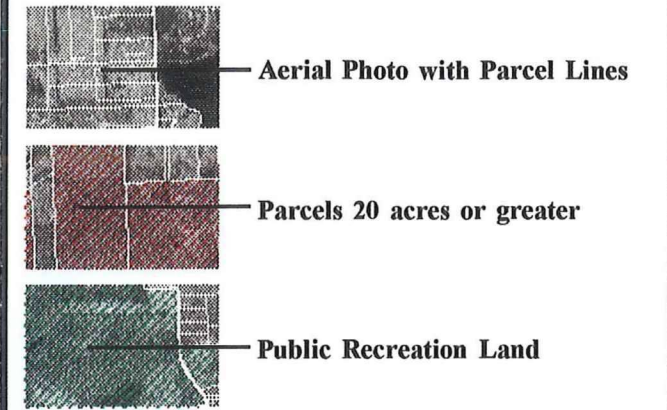
Establish Interjurisdictional Cooperation; Develop Joint Conservation Policies, Goals and Measurable Objectives; and Review Master Plans and Zoning Ordinances for local conservation planning and management practices.



Form Study Committee
Committee would review park management plan to identify programs, activities, and tasks for the identification, preservation, and protection of the Highland Lake State Recreation Area ecology, i.e., **Collecting Base-line Data** on MNFI Natural Areas, property Acquisition/Conservation Easements, and Natural Landscaping.

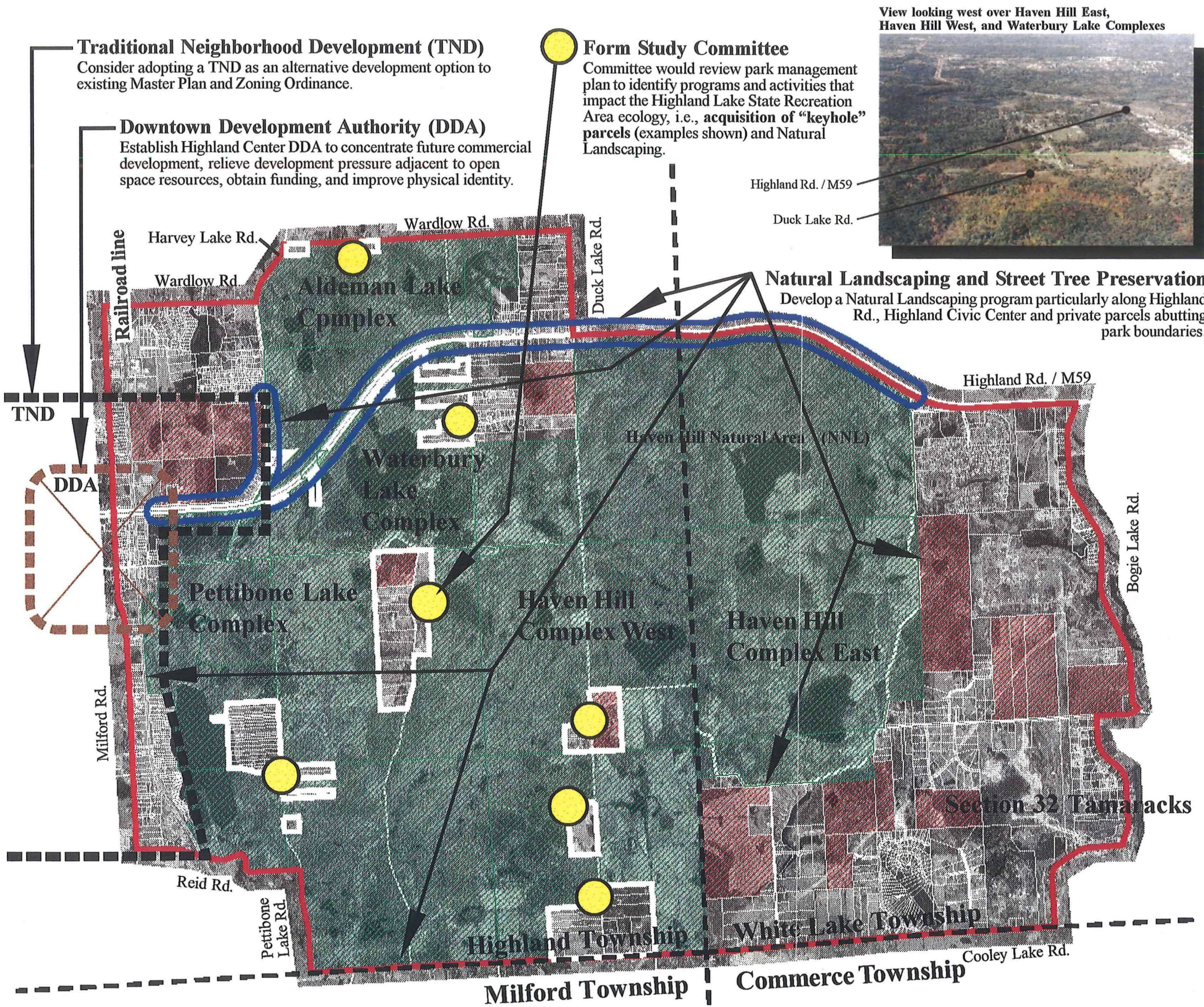
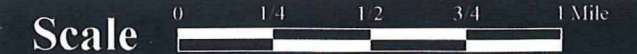
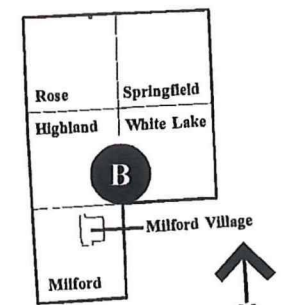


Application Area 'B'



Notes:

1. Arrows related to a particular recommended action, point to either a generalized location or only some representative parcels in the area.
2. In this application area, consideration should also be given to applying the Tools and Techniques identified in Application Areas 'A' and 'C', where applicable.
3. Refer to *Chapter III* and *Appendix* for complete information on the MNFI Natural Areas.



APPLICATION AREA 'C'

Area Description

Application Area 'C' is located in the southwestern part of the project area within Highland and Milford Townships and the Village of Milford and covers approximately 3½ square miles. The area includes all or part of two MNFI sites, Rowe Lake Complex and Sherwood Creek Woods. Only part of the Sherwood Creek Woods site was inventoried due to lack of permission by all property owners for ecologists to access their lands. No report was prepared.

The Huron River abuts the area to the south and several lakes are scattered throughout. Ecological quality based on intactness, significant upland/wetland complexes, and diversity of element occurrences is relatively low, and the potential for restorability is moderate. The area is entirely in private ownership with few parcels greater than twenty acres in size. Because of the variety in parcel size and amount of current development, the land resources are generally fragmented. The portion of Milford Village included in the application area is mostly built-out. The area in Milford Township is master planned for residential use with a minimum lot size of 1-2.5 acres. The portion in Highland Township is planned for less intense residential development with most lot sizes being 10 acres or greater.

Primary Focus

The focus in area "C" is 1) to preserve and protect identified natural areas for their contribution to local character, regardless of their ecological ranking, 2) to respect local historic planning traditions in future developments, and 3) to improve/repair the landscape fabric of the area through restoration and natural landscaping.

Planning Approach to Conservation Management

This application area is entirely in private ownership with undeveloped parcels both less-and-greater than twenty acres in size. Combined with the two MNFI natural areas, the proximity to downtown Milford, and the prevailing fragmented landscape of the area, it is suggested that a combined approach of municipal guidance (including code revision and enforcement) and citizen involvement in resource management should be undertaken.

The objective in this application is to establish a linear network of natural open space through the preservation, restoration, and enhancement of a fragmented landscape. This would be accomplished by developing an interjurisdictional greenways plan. Knitting the linear qualities of the MNFI potential natural areas together with the adjacent Potential Grassland Restoration Zones would be the basis for the plan. Additionally, wooded patches and tree rows would be naturally reinforced, conservation easements obtained, and an aggressive natural landscaping program would be initiated. The actions listed below are recommended for consideration in the preparation of a conservation management plan and are directly related to fulfilling the objective of the area's primary focus. Local conditions will dictate where or when any one of the actions should be initiated. When a particular tool, technique, policy, or ordinance is cited, refer to *Chapter V* and *Chapter VI* for details.

Two graphics have been prepared to generally illustrate where the following steps can be implemented. The Opportunities Plan is used as the base map for the first graphic thereby showing how the plan can be used as the framework for local conservation planning. The parcel fabric is the base map for the second graphic. Each community's parcel base will be available in a digital format through the Oakland County Geographic Information System. This format suggests one way communities can use the parcel information to monitor and track activities.

1. Prepare a Greenways Plan. One of the project's area-wide recommendations is to create a region-wide open space network, or greenway plan. The focus of this application is to show how an open space network might be developed within a specific physical setting that follows the intent of the Natural Areas Opportunities Plan.

In many areas, natural corridors and unbroken landscapes have been destroyed, fragmented, or degraded by residential and commercial development and the construction or upgrading of roads. In response to this condition, local governments should have a greenways element in their comprehensive plans. Natural greenways can: 1) ensure the preservation of local natural areas, historic sites, and open space; 2) foster the use of river corridors, recreation trails, and other natural areas and opens spaces to link community facilities; 3) encourage alternative modes of transportation, 4) help revitalize existing urban centers; 5) promote local passive recreation opportunities; 6) preserve and enhance wildlife habitats, 7) enhance the overall quality of life; and 8) increase property values. Integrating greenway corridors into an existing plan will help identify these many added benefits to the community as a whole.

2. Initiate Municipal/Property Owner Cooperation. Since the area's natural ecosystem transcends municipal boundaries, protecting water quality and retaining the integrity of the local ecology will require cooperation and coordination. All three municipalities and local property owners need to be involved in this effort. Educational programs should also be developed and promoted. The Community Advocate should initiate the coordination and education efforts.

3. Encourage Natural Landscaping. The use of natural landscaping is a tool for improving water quality by reducing stormwater runoff, soil erosion, and the use of chemical-based fertilizers and pesticides. Coordinating the amount, type, and location of natural landscaping between private property owners can also result in creating significant natural buffers to adjacent protected natural areas, linkages between preserved open space areas, avoiding fragmentation of key resources, and providing a greater critical mass of wildlife habitat. The use of natural and native landscaping should be encouraged within this application area, as well as other areas project-wide.

The planning, design, installation and management of natural landscaping projects will vary in complexity and approach depending on the nature of the particular site and the project goals. There are different degrees of natural landscaping, ranging from a small native flower patch, to a full-scaled replication of plant communities covering many acres. Small parcels can incorporate a "natural" stormwater lagoon with a fringe of native wetland plants and an upland buffer to trap sedimentation. Large parcels are more involved, financially and visually, and require a detailed and technical planning process. Regardless of size, it is recommended that landowners receive technical advice in establishing project goals and developing a specific approach to natural landscaping.

Property owners should work together and organize themselves for the purpose of sharing ideas and combining efforts to improve upon landscape fragmentation. This could be done between immediate neighbors sharing a common wooded patch or tree row, at the larger neighborhood scale, the municipal level, or between municipalities. The objective would be to prepare a strategy, or plan of action, for developing a unified approach to local natural landscape management. The planning steps would include 1) identifying and evaluating the existing land resources, 2) setting and prioritizing goals, 3) considering alternative actions, 4) preparing a local management plan, 5) implementing the plan, and 6) monitoring the results.

For detailed information, refer to the following documents on natural landscaping planning and

management.

Sargent, Mark and Kelly Carter (Editors and Project Coordinators), *Managing Michigan's Wildlife: A landowner's guide*, Michigan Department of Natural Resources and Michigan State University, 1999

Northeastern Illinois Planning Commission; *Natural Landscaping for Public Officials: A Source Book*, Chicago; second printing August 1997

4. Develop Joint Conservation Policies, Goals, and Measurable Objectives. Local officials of the three municipalities can play an important role in encouraging the use of natural landscaping through government leadership. A staff person should be given the responsibility for developing, implementing, and monitoring a multi-year work program related to the: 1) development of local policies and a legal framework, 2) promotion of demonstration projects, 3) development of educational materials and information to the public, and 4) revision of municipal weed ordinances.

5. Collect Baseline Data. This application area includes all or part of two identified MNFI natural areas, neither of which having been completely inventoried. A mechanism should be identified by the three municipalities for the funding of these site inventories, including establishing their secondary boundaries of influence and the identification of their respective ecological threats and stewardship considerations.

In the process of developing a unified approach to local natural landscape management, property owners should work with a qualified ecologist to identify and evaluate their land resources. After parcels are inventoried for plant and animal species, this information can be used in determining the opportunities for 1) expanding wooded patches and tree rows and 2) establishing natural greenway linkages and corridor connecting areas. Parcels should be monitored for changes in the site's ecology and habitat characteristics.

6. Review Zoning Ordinances and Regulations. Local officials should adopt or modify their plans, regulations, and ordinances to facilitate the use of natural landscaping on private property. The following are the steps involved. 1) Review and amend or replace the local weed ordinance so that it encourages natural landscaping. 2) Adopt a Natural Landscape ordinance. 3) Amend subdivision regulations and other ordinances that govern landscaping of sites in order to accommodate and encourage natural landscaping. 4) Develop and adopt fire department procedures for permitting and overseeing prescribed burning of natural areas; inform the public of these requirements. 5) Include Natural Landscaping goals and policies in local master plans. 6) Designate greenways in local master plans, land use plans, and park plans.

7. Pursue Conservation Easements. In establishing a greenways network, conservation easements should be considered for a part or all of select private parcels containing sensitive natural resources. Conservation Easements should also be pursued where natural linkages occur within corridor connecting zones to provide for their permanent protection and incorporation into the overall greenway system.

8. Encourage Open Space/Cluster Design and Lot Averaging. Where appropriate, new development should be encouraged to incorporate the site design techniques of open space/cluster and lot averaging. These methods enable the developer to provide the same number of units allowed in the zoning ordinance while preserving those areas identified as being valued natural resources. These are also appropriate site design techniques for retaining natural greenway

linkages and corridor connecting areas for species habitat. Achieving the permitted density is accomplished by allowing flexibility in lot sizes and layouts

9. Implement Stormwater Management/Impervious Surface Regulations. Establishing a stormwater management plan, including related development regulations and site plan review procedures, is an effective method of preventing flooding and maintaining water quality. Regulatory considerations can also be a mechanism for identifying natural features to be protected. A stormwater management plan addresses topics characteristic to natural drainage, site runoff, erosion and sedimentation, condition of water resources, soils, slopes, detention areas, and strategies for handling future development concerns related to the amount, type, and location of impervious surfaces. Coordination between Highland and Milford Townships and the Village of Milford will be important since they share common drainage districts. Working together for the purpose of addressing the issues of flooding and water quality could result in benefits to all three communities, particularly as it relates to this demonstration area and the creation of an ecologically viable, interjurisdictional greenway plan. The three communities could accomplish this by cooperatively developing the same strategy and language to their individual plans, regulations, and/or ordinances.

Application Area “C”
Summary of Key Actions and Areas of Responsibility

<u>ACTIONS</u>		Municipal Officials	Municipal Planning Commission(s)	Planning Consultant / Staff	Developers	Property Owners/Residents	Watershed Councils	Land Conservancies	Community Advocate	Others
1.	Prepare a Greenways Plan	●	●	●		○		○	○	H
2.	Initiate Municipal / Property Owner Cooperation	●	●	○		●			●	
3.	Encourage Natural Landscaping	●	●	●	○	●		○	●	D, H, I, L
4.	Develop Joint Conservation Policies, Goals and Measurable Objectives	●	●	○						
5.	Collect Baseline Data	●		○		●	○	○		L
6.	Review Zoning Ordinances and Master Plans	●	●	●	○	○				
7.	Pursue Conservation Easements	●	○	○	○	○		○	○	
8.	Encourage Open Space/Cluster Design and Lot Averaging	●	●	●	○	○				H
9.	Implement Stormwater Management / Impervious Surface Regulations	●	●	●	○	○	○			E

Others:

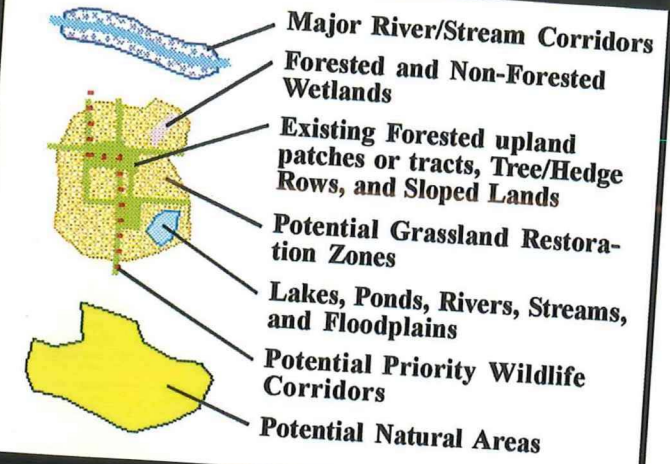
- A. Huron Clinton Metropolitan Authority
- B. MI Department of Natural Resources
- C. MI Department of Transportation
- D. MI State University Cooperative Extension
- E. Oakland County Drain Commission
- F. Oakland County Health Department
- G. Oakland County Parks & Recreation Commission
- H. Oakland County Planning & Economic Development Services
- I. Resource Inventory Agency such as MNFI
- J. Public Safety Officials
- K. Road Commission for Oakland County
- L. Volunteers

Primary / Lead Role
 Secondary / Support Role



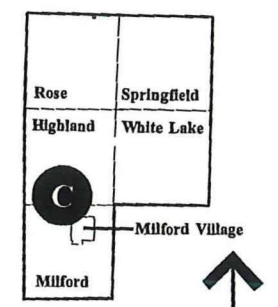
Potential natural open space linkages

Application Area 'C'



Notes:

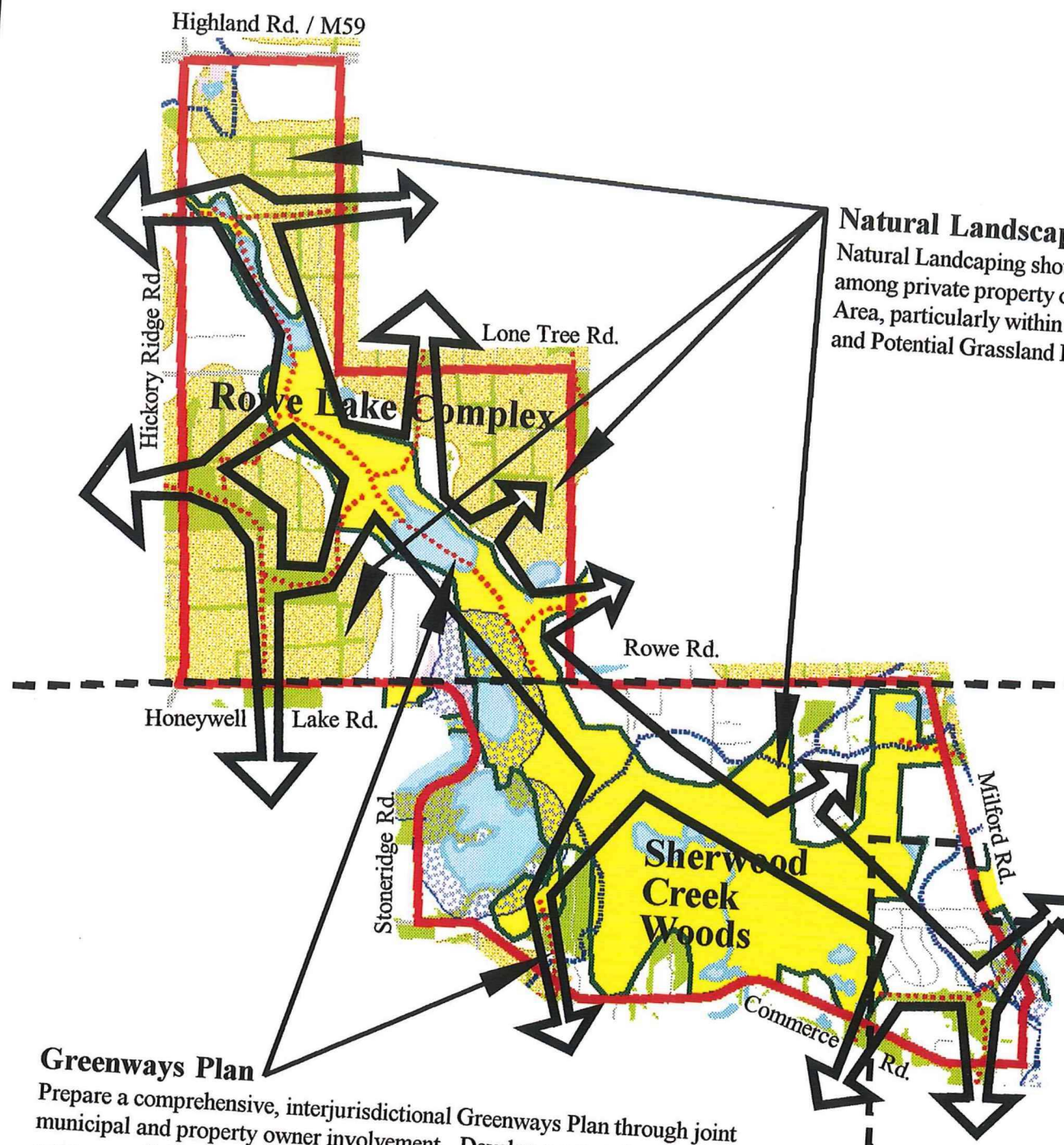
1. The adjacent base map for this application area is the Natural Areas Opportunities Plan as described and illustrated in *Chapter IV*.
2. Arrows related to a particular recommended action, point to either a generalized location or only some representative parcels in the area.
3. In this application area, consideration should also be given to applying the Tools and Techniques identified in Application Areas 'A' and 'B', where applicable.
4. Refer to *Chapter III* and *Appendix* for complete information on the MNFI Natural Areas.



Location Key



Scale



Natural Landscaping

Natural Landscaping should be encouraged and coordinated among private property owners throughout the Application Area, particularly within the greenway planning corridor and Potential Grassland Restoration Zones.

Highland Township

Milford Township

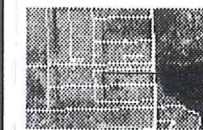
Establish Intergovernmental Cooperation; Develop Joint Conservation Policies, Goals and Measurable Objectives; and Review Master Plans and Zoning Ordinances for local conservation planning and management practices.

Village of Milford

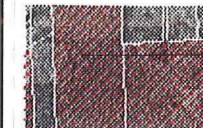
Greenways Plan

Prepare a comprehensive, interjurisdictional Greenways Plan through joint municipal and property owner involvement. Develop a network of natural open space linkages based on resource preservation, restoration and Natural Landscaping.

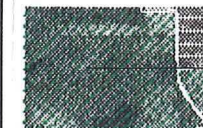
Application Area 'C'



Aerial Photo with Parcel Lines



Parcels 20 Acres or Greater

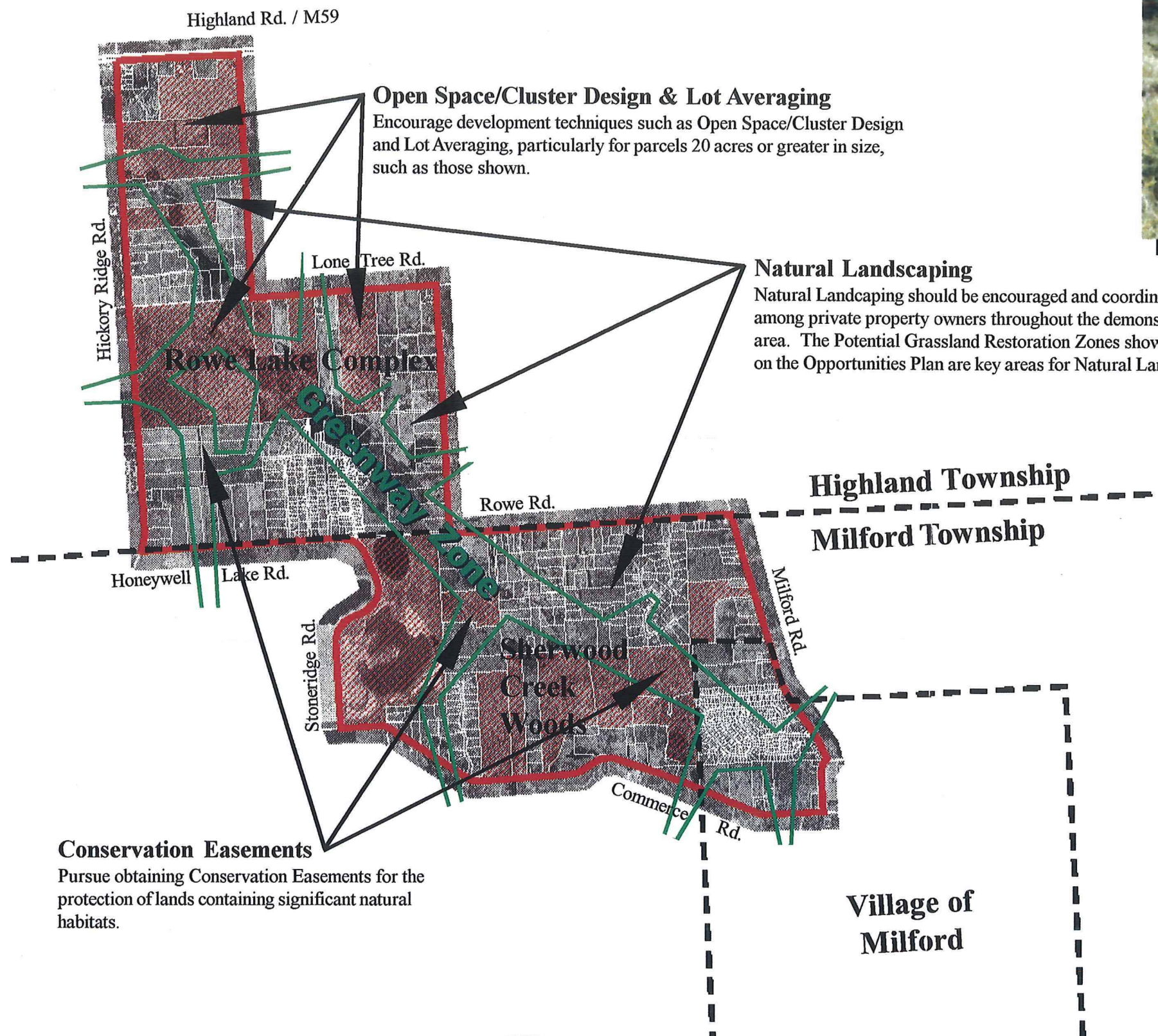
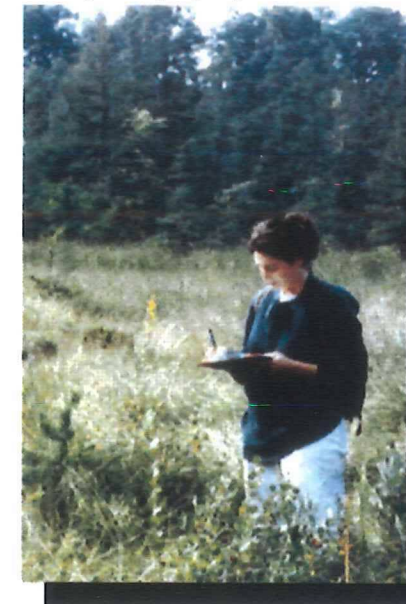


Public Recreation Land

Notes:

1. Arrows related to a particular recommended action, point to either a generalized location or only some representative parcels in the area.
2. In this application area, consideration should also be given to applying the Tools and Techniques identified in Application Areas 'A' and 'B', where applicable.
3. Refer to *Chapter III* and *Appendix* for complete information on the MNFI natural areas.

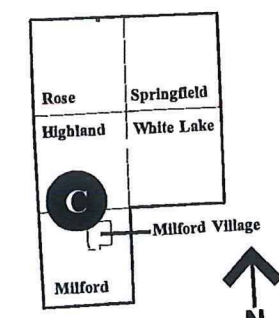
Ecologist coordinates a landscape management plan for adjacent property owners.



Open Space/Cluster Design & Lot Averaging
Encourage development techniques such as Open Space/Cluster Design and Lot Averaging, particularly for parcels 20 acres or greater in size, such as those shown.

Natural Landscaping
Natural Landscaping should be encouraged and coordinated among private property owners throughout the demonstration area. The Potential Grassland Restoration Zones shown on the Opportunities Plan are key areas for Natural Landscaping.

Conservation Easements
Pursue obtaining Conservation Easements for the protection of lands containing significant natural habitats.



Lessons Learned

The S&H Project has been a very worthwhile undertaking. The benefits of the project extend beyond items such as the recommendations, policies, and ordinances documented in this report. Benefits also take the form of lessons learned and what to do differently next time. Below are seven items, which in hindsight seem apparent, but at the onset of the project were not fully understood. These lessons learned will hopefully help those who model other local resource preservation projects after the S&H Project.

- **The site identification and ranking methodology used by the Michigan Natural Features Inventory was substantiated by the natural resource data that the ecologists, botanists, and zoologists collected during the field inventories.** The data sources that the MNFI used and the criteria and point system the MNFI developed, for use in this project, resulted in a range of numeric site rankings. *Please refer to Chapter III.* For sites that received high point rankings (Long Lake and Buckhorn Lake Complex) the field inventory work identified high quality natural communities. At sites that received lower point rankings (G M Road and Buckhorn SE) the field inventory work identified highly degraded natural communities.
- **In order to preserve natural areas, an ecosystem-based approach to conservation should be used.** Conservation efforts, to be most successful, should look beyond the borders of fragile natural areas. Efforts should not be isolated to only wetlands or only woodlands. The interactions of the natural environment are complex and diverse. What happens adjacent to, or upstream, from a natural area can be equally as important to the health of the ecosystem as what happens within the natural area. For this reason, development in the uplands for example, also needs to be monitored to ensure potential negative effects are mitigated. *Please refer to Chapter I.*
- **Knowledgeable and committed individuals need to be involved in the process of obtaining permission to access property for the resource inventories.** The process of obtaining permission took longer and required more effort than was originally thought. The person responsible for obtaining permission needs an understanding of the general location of the natural resources and how the land is parceled, so they can properly target their efforts. It is more important to target the larger parcels for permission rather than concentrating on smaller, perimeter parcels. In some cases, permission was granted for only a few small parcels making up the site. When the large property owners did not respond, the MNFI could not justify going out to the site since the core of the ecosystem could not be inventoried. Therefore, it is important to develop a strategy for obtaining permission, including follow-up to the initial request. Follow-up is essential since many property owners are reluctant to allow someone on-site without understanding what is being looked for and how this information will be used. This further illustrates the importance of the contact person being knowledgeable, so they can communicate to the property owner the value of having a resource survey conducted.
- **A well organized and structured process should be used in tracking permission and tracking site visits.** During this phase of the project it was difficult to determine, at any given time, the status of the permission given to access private property throughout the six-community project area. One item that contributed to the difficulty was the lack of a complete, consistent, land parcel database for the entire project area. Some of the information was in a digital format (Geographic Information System) and some was on hand drawn maps. In addition, not all of the maps were current. The use of Global Positioning

System (GPS) technology also would have been useful to help the field ecologists track what areas of the site had been visited

- **All of the sites identified by the MNFI during this project are important.** The existence of the pre-settlement conditions present at the Long Lake and Buckhorn Lake Complex sites is remarkable. Natural areas with intact communities representing pre-settlement conditions are very significant and very rare throughout the study area and Oakland County. *Please refer to Chapter III.* Finding these pre-settlement conditions, however, does not lessen the importance of the MNFI identified sites that did not receive high ecological rankings or contain pre-settlement landscapes. The importance of these other sites may not be in their ecological value but in their significance relative to the local setting. This is especially true if the setting has experienced a high degree of development and landscape fragmentation, as exists in the southern portion of the S&H Project area. The significance of these areas is in their contribution to the open space character, wildlife habitat, and linked natural resource greenways for local communities. *Please refer to Chapter IV.*
- **Two key pieces of information, water quality and hydrology data, are missing from this study.** The Steering Committee, Advisory Committee, and project staff could not locate consistent, documented data for the project area on water quality and hydrology. Because of this, gathering water quality data will be a necessary next step in order to establish a baseline, against which the impacts of preservation and developmental pressures can be measured. The lack of hydrological data meant that the MNFI could not accurately factor groundwater flow into the establishment of the secondary site boundaries. Based on topography, surface water flow was considered in establishing the secondary boundaries, but groundwater and surface water flow do not necessarily correspond.
- **It is important to assemble a committed, stable, and knowledgeable steering committee that will stay involved for the duration of the project.** Involved committee members will become advocates and spokespeople that can carry the project into implementation. They can also help to “institutionalize” the project, incorporating findings and recommendations into the local government’s approach toward conservation. A related observation is that municipalities are not alike – political support and interest, land ownership/fragmentation, quality and type of natural areas - all influence the approach to be taken toward conservation.

Finally, one of the most gratifying aspects of the S&H Project was finding many natural gems still existing within a suburbanizing county. The locations and environmental value and quality of some of these areas were unknown until this study was conducted. Now that they are known and documented, it is incumbent on all those involved with planning, regulation, and development, in and around these sites, to protect them. In order to protect them, the recommendations outlined in this report must be implemented.

Implementation will be very challenging considering the number of players that need to be involved. Local municipalities will not only have to inform and educate property owners and developers, but also institutionalize the practices outlined in this report into their planning and regulatory procedures. Property owners and developers will need to recognize that the way they maintain or develop their land has impacts far beyond the limits of the property boundaries. County agencies will need to alter the way they do business and move from being primarily a service provider, to proactively planning for their services in ways that protect the environment. County planners need to apply the methodology established during the project to the rest of Oakland County and distribute the information to all of the remaining municipalities. By carrying this study forward into implementation, the natural systems can be protected,

development can be accommodated, and Oakland County can continue to be a very desirable place to live, work, and recreate

GLOSSARY

- Aquifer** - A distinct band or layer of gravel, sand, or porous, fractured, or cavernous and vesicular rock capable of holding and/or conducting water. When fully charged, an aquifer is saturated with water.
- Aquifer Recharge** - The addition of water to an aquifer that occurs naturally from infiltration of rainfall and from water flowing over earth materials that allow water to infiltrate below the land surface
- Biodiversity** – The variety of life on earth and the ecosystems they form.
- Canopy** - Typically the uppermost continuous layer of branches and foliage in a stand of trees, but can also refer to middle and lower layers in stands that are multi-storied.
- Canopy Closure** - The degree to which the canopy foliage overhead blocks sunlight or obscures the sky.
- Catkins** – A type of flower characteristic of willows, birches, and oaks that is typically soft, flexible, drooping and looks like a scaly spike
- Coastal Plain Marsh** - A grass and rush dominated wetland on shores of softwater seepage lakes, ponds, or depressions, where water levels fluctuate yearly and during each season.
- Community (Plant)** -A vegetative complex that is unique in its combination of plants and occurs in particular locations under particular environmental conditions. The plant community is a reflection of the prevailing environmental influences, including soils, temperature, elevation, solar radiation, slope, aspect, and rainfall.
- Conifer** - A wide range of tree species, typically evergreen, bearing cones, and having needle-shaped or scale like leaves that are typically retained throughout the year.
- Conservation** – The management or control of human use of resources and activities on the planet, in an attempt to restore, enhance, protect, and sustain the quality and quantity of a desired mix of species, and ecosystem conditions and processes for present and future generations.
- Deciduous** - Plants whose leaves or flower petals are not persistent and fall off at the end of a defined growing season or during a period of temperature or moisture stress. It typically refers to leaves on broad-leaved trees, but some conifers are also deciduous.
- Depressions** – Circular or irregular enclosed hollow separated from the surrounding area by a distinct slope break.
- Dry-Mesic** – Describing a soil that has some water and nutrient holding capacity, but is predominately dry most of the year.
- Dry Sand Prairie** - Dry, native grassland, dominated by little bluestem, pennsylvania sedge, and big bluetem, typically found on level, sandy landforms.
- Dry Southern Forest** - An oak-dominated forest type of dry sites.
- Ecosystem** - A community of plants and animals interacting with each other and their physical/chemical environment.
- Emergent Marsh** - A shallow water marsh characterized by emergent narrow and broad leaved herbs and grass like plants as well as floating leaved herbs at the shores of lakes and streams.
- Exotic Species** - A non-native plant or animal introduced from another geographic area.
- Forest** – In the narrow technical sense, a vegetation community dominated by trees and other woody shrubs, growing close enough together that the tree tops touch or overlap, creating various degrees of shade on the forest floor.
- Forested Upland** - Areas consisting of mesic forests dominated by beech and sugar maples as well as dry-mesic oak hardwood forests on dryer sandy loams.
- Forested Wetlands** - Areas consisting of relict conifer swamps, and/or southern floodplain forests

Habitat Fragmentation – The alteration or breaking up of habitat into discrete or tenuously connected islands as a result of modification or conversion of the landscape by management activities.

Hanging Fen – The portion of a prairie fen located along a relatively steep gradient

Herbaceous - Vegetation (forbs, grasses, or ferns) whose above ground parts die down during the winter months.

Hillside Prairie - Native grassland and savanna relicts on dry exposed slopes and crests of hills, surrounded by oak forest or former oak savanna.

Hydrology - The science of water, its properties, and movement (cycling) over and under land surfaces.

Inland Salt Marsh - An herb dominated wetland on mineral soil which is saturated by sodium and chloride laden groundwater from natural brine aquifers.

Intermittent Wetland - An herb or herb-shrub wetland along lakeshores or in depressions, experiencing fluctuating water levels seasonally and from year to year.

Kame – An irregular or conical hillock composed chiefly of sand and gravel, formed by deposition of meltwater-transported sediments in contact with stagnant glacier ice

Kettle Depressions – A closed depression or hollow in glacial drift that has resulted from the melting of a buried or partly buried mass of glacier ice.

Lakeplain Oak Openings - A wet to mesic savanna type on sand ridges and slightly raised level areas, in an undisturbed state usually adjacent to Lakeplain Wet-mesic and Wet Prairie.

Lakeplain Wet-Mesic Prairie - Native lowland grassland on moist, level, occasionally inundated sites.

Lakeplain Wet Prairie - Native Lowland grassland on moist, level, seasonally inundated sites.

Man-altered/Developed (Non-Forested Upland) - Areas currently developed with residential, agricultural, commercial, or industrial land uses

Mesic – Describing a soil well supplied with moisture throughout the year, that is not overly dry or wet

Mesic Prairie - Mesic, native prairie found on level to gently rolling ground, consisting of sandy loam and loam soils, dominated by big bluestem, little bluestem, and Indian grass.

Mesic Sand Prairie - Mesic, native grassland, mostly relicts of mesic sand savanna or Lakeplain Oak Openings, prone to summer drought but sometimes inundated in early spring; consequently, species more typical of lowland prairies thrive next to ones of upland prairies.

Natural Area – A tract of land or water which has the following characteristics: has retained or reestablished its natural character, or has unusual flora and fauna or biotic, geologic, scenic, or other similar features of educational or scientific value, but it need not be undisturbed; has been identified and verified through research and study by qualified observers; may be coextensive with or part of a wilderness area or wild area; does not have any minimum or maximum area requirement.

Oak Barrens - A savanna type of scattered and clumped trees and shrubs (typically 1-8 trees per acre) in a matrix of grass, typically surrounding Dry Sand Prairie openings.

Oak Openings - Formerly widespread savanna type known mostly from literature and data derived from severely disturbed sites. Dry-mesic conditions prevailed, becoming mesic with moderating site factors and degree of canopy closure.

Old Field (Non-Forested Upland) - Herbaceous areas that are usually dry and support grasses and shrubs. They consist of old cultivated fields and have been altered.

Open Shallow Water (Non-Forested Wetland) - Areas characterized by emergent and submergent vegetation including broad leaved herbs and grass as well as floating herbs.

Pine Plantation - Lands specifically managed for the short-term growth and harvesting of pine trees.

Pond (Ice Block Depression) - Open bodies of water that are less than 20 acres in size and do not dry up during summer months. There is little emergent vegetation but some floating vegetation may occur around the edges.

Prairie Fen - An herb or herb shrub wetland on saturated peat, through which flows groundwater rich in calcium and magnesium carbonates.

Preservation – A land-use designation that signifies little or no human activity or use within the designated area

Primary Boundary - Boundary representing the core area of the unique natural features of the site.

Red Pine - All Pines are wind-pollinated, produce wind-disseminated, winged seeds, germinate best on exposed mineral soil; grow rapidly; are not tolerant of shade; and exert similar influences on the soil. Red Pine differs from White Pine in that it is less shade tolerant, can germinate and grow well on drier sites with a lower nutrient content, and is more resistant to ground fires and other basal injuries.

Regeneration - The renewal of plants by natural or artificial means (also includes herbaceous plants)

Relict Conifer Swamp - A wet forested peatland nourished by mineral rich waters.

Restoration - A process of returning ecosystems or habitats to their original structure and species composition

Riparian - Pertaining to anything connected with or immediately adjacent to the banks of a stream or other body of water.

Secondary Boundary - boundary representing the minimal area for which special protections or planning techniques are needed to maintain the unique natural features within the primary boundary.

Southern Dry-Mesic Forest - Oak or oak-hardwood forest type on generally dry-mesic sites typically found south of the tension zone.

Southern Mesic Forest -A southern hardwood forest type on moist ground dominated by sugar maple and beech, lying mostly south of the transition zone.

Southern Shrub-Carr - Areas characterized by fluctuating water levels, poor drainage, and saturated muck soils dominated by shrubs such as dogwoods and willows

Southern Swamp - A deciduous forest type found in poorly drained depressions south of the transition zone, dominated by silver maple and red ash.

Southern Wet Meadow (Sedge Meadow) – A sedge and grass dominated wetland located mostly south of the transition zone primarily along stream valleys and lake margins.

Submergent Marsh - A chiefly submerged marsh of deep to sometimes shallow water in lakes and streams.

Surface Runoff - The part of precipitation and snowmelt that reaches streams by flowing over the ground without penetrating the soils.

Understorey - The trees and other woody species growing under the upper canopies of larger adjacent trees and other woody growth.

Vernal Pools - Small, isolated wetlands that retain water on a seasonal basis.

Wetland Complex - Two or more individual wetlands in close proximity that are connected spatially and/or hydrologically.

Wet-Mesic Prairie - Native lowland grassland on moist, level, occasionally inundated sites.

Wet Prairie - Native lowland grassland on saturated, level, occasionally inundated sites.

Woodland Prairie - Mesic to dry-mesic native grassland, mostly relicts of Oak Openings.

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