This section describes the Prairie Creek Master Plan and recommendations. The recommended Master Plan elements are firmly based on the guiding principle, and input from the steering committee, focus groups, and the public.

Elements of the Prairie Creek Master Plan are presented in the following manner:

- Mission Statement
- Goals & Objectives
- In-depth explanation of the Objectives

Mission Statement

The mission of the Prairie Creek Master Plan is to provide guidance for responsible, ecologically sound development that considers quality of life and the protection and enhancement of Prairie Creek Reservoir and supporting watershed as an asset recognizing the reservoir's primary purpose as a secondary drinking water source for the City of Muncie.

Goals & Objectives

General statement: These are the Goals and Objectives of our Master Plan. Goals are statements of desired future conditions. Objectives describe measurable methods of accomplishing the goals. Some Objectives support more than one Goal and are therefore listed more than once. All of the Goals are of equal importance and are not listed in order of priority.

Goal A: Protect and ensure the longevity of Prairie Creek Park and Reservoir for future generations.

Objectives:

1. Encourage the City of Muncie to pursue extending the lease for Prairie Creek Park with the Indiana-American Water Company.
2. Before the land inside the "ring roads" becomes available, establish an agreement for first right of refusal that is embraced by both the City of Muncie and Delaware County.
3. If the land inside the "ring roads" and/or other adjacent IAWC properties goes up for sale, purchase them.
4. Encourage 501(c)3's, nonprofit organizations, to help gather resources to protect and promote Prairie Creek Reservoir and the long term transition envisioned in this plan.
5. Work with relevant existing community entities for the implementation of the objectives in this master plan.

Goal B: Protect and enhance the long term ecological health and water quality of the Prairie Creek Reservoir and supporting watershed.

Objectives:

1. Control developmental impacts in immediate vicinity of the reservoir.
    a. Rezone the area within the "ring road" to the conservation/recreation zone.
    b. Encourage owners of properties outside the "ring roads" that are used, could be used, and/or land banked for purposes such as habitat preserves, conservation areas, greenspace, and farmland conservation to rezone those properties to the conservation/

recreation zone. (See expanded Objectives, whereby the Plan Commission could offer to do the rezoning for these properties as an incentive.)
    c. Amend local ordinances to ensure that no large scale developments can occur without the existence of sewer and water utilities, or equivalent alternatives.
    d. Initiate policies and/or amend ordinances as applicable for new development to ensure that no individual on-site sewage disposal systems (OSDS) may be located within the "ring road" boundary.
    e. Develop and implement a program that is a joint effort between the Bureau of Water Quality and Delaware County Health Department to investigate and improve, as needed, water quality in the greater New Burlington area.
2. Reduce sedimentation and accompanying nutrient and pesticide loading in the reservoir.
    a. Establish and manage constructed wetlands before the bays and inlets of Prairie Creek Reservoir.
    b. Create and maintain 50-foot vegetated buffers around the shoreline of the existing ATV course to mitigate sediment loading and erosion impacts.
    c. Promote conservation farming practices in the Prairie Creek watershed, including best management practices for drainage, nutrient management, pesticide management, soil conservation, surface water protection, tillage/residue management, and waste management.
    d. Restore areas where erosion has occurred.
    e. Support and augment where possible the establishment of 120' wide vegetated buffers on each side of streams and ditches with permanent flows, and 20'-30' wide on each side of intermittent streams and ditches in order to reduce sediment and nutrient loading to stay the progress of eutrophication of the reservoir.
3. Develop and promote a program to educate people about: 1) proper on-site wastewater treatment system maintenance, 2) the health ramifications from failed/failing individual on-site wastewater treatment systems and 3) alternative sewage/wastewater treatment systems.
4. Support/enhance enforcement of existing laws (410 IAC 6-8.1) governing residential on-site sewage disposal systems, including options for funding relief.
5. Increase biodiversity in and around the reservoir.
    a. Establish a Land Restoration-Revegetation Management Plan.
        i. Establish a Flora Assessment Study for the area within the "ring roads".
        ii. Restore, enhance, and reestablish the historical native plant communities of the Tipton Till Plain in the area surrounding Prairie Creek Reservoir.
    b. Create wetland and improve aquatic habitats in Prairie Creek Reservoir to increase biodiversity.

Goal C: Ensure good design reflecting sound ecological practices for new development and redevelopment in the watershed.

Objectives:

1. Amend local ordinances to ensure that no large scale developments can occur without the existence of sewer and water utilities or equivalent alternatives.
2. Develop an ordinance amendment requiring all new housing developments in the Prairie Creek Watershed to meet conservation design standards.
3. Establish model plat restrictions that ensure use of sound ecological practices, and require

their use on any land in the area that gets platted.
4. Encourage private landowners to use the model plat restrictions as deed restrictions to ensure sound ecological practices on individual properties.
5. Encourage and enforce best management practices for sediment reduction during construction in the watershed.
6. Amend or adopt local ordinances to require that lots are of sufficient size to accommodate both the initial OSDS and repair/replacement space; both spaces must remain uncompromised and viable.
7. Protect existing on-site wastewater treatment systems that are not in failure.
    a. Require all on-site wastewater treatment system repairs to meet new construction standards for on-site wastewater treatment systems.
    b. Adopt an ordinance that requires all building permits to include an on-site wastewater treatment system review by the Health Department.[1]
8. Amend local ordinances to coordinate the requirements/permitting processes for stormwater control when soil types require perimeter drains for an OSDS.

Goal D: Promote the full potential of Prairie Creek Reservoir as a community asset with regional appeal.
Objectives:
1. Expand promotion of Prairie Creek Park as a visitor destination.
2. Develop and enhance wayfinding and marketing devices, including signage, maps, brochures, and websites, to assist people in locating Prairie Creek Reservoir and educating the public about available recreational opportunities.
3. Promote the development of special events that enhance the community service/amenity value and the attraction destination/economic development potential at Prairie Creek Reservoir.
4. Establish fair regulations for campers that encourage attractive short-term use of campsites at Prairie Creek Park.
5. Capitalize on and promote an opportunity for unique overnight accommodations.
6. Encourage the development of a specialty restaurant located on the east side of the reservoir with view of the Sailing Club.
7. Investigate the feasibility of design standards, overlay districts, planned unit developments, etc. that provide a mechanism to maintain and to capitalize on (from an economic development standpoint) the rural, naturalized character of the Prairie Creek area.
8. Investigate the feasibility of a conference center/hotel that capitalizes on the natural character of the Prairie Creek area.

Goal E: Provide ample opportunity for recreational use and development of Prairie Creek Park facilities.
Objectives:
1. Balance the recreation needs for active and passive activities at Prairie Creek Park.
2. Develop walking/bicycle trails that encircle Prairie Creek Reservoir.
3. Retain and enhance the separate trail system for horseback riders.

1 While this objective focuses on on-site wastewater treatment systems, the Health Department should be included in the permit process for all new construction for additional potential environmental hazards including but not limited to lead paint.

4. Design children's play areas that emphasize learning and connections to the natural environment.
5. Provide an access area for non-motorized boats.
6. Comply with ADA (Americans with Disabilities Act) standards for a "natural park".
7. Promote the establishment of 120' wide vegetated buffers on each side of streams and ditches with permanent flows, and 20'-30' wide on each side of intermittent streams and ditches in order to reduce sediment and nutrient loading to maintain acceptable levels in the reservoir for human recreational use.

Goal F: Increase quality of life for residents of Delaware County and enhance visitor experience by improving accessibility, usability and enjoyment of the reservoir.
Objectives:
1. Improve visitor access to Prairie Creek Reservoir.
    a. Designate a point of entry and gateways for Prairie Creek Park.
    b. Designate route(s) for best access.
    c. Make needed road improvements.
2. Promote bike and pedestrian use of Prairie Creek Reservoir.
    a. Develop bike and pedestrian trails that encircle the reservoir.
    b. Include bike lanes in the needed improvements to the road structure of the "ring roads".
    c. Install pervious surface parking facilities adjoining bike trails for park and peddle opportunities in the park.
    d. Connect trail system to Cardinal Greenway.
3. Use Prairie Creek Reservoir as a focus to educate the public about environmental issues including water quality, compatible development, and wildlife habitat needs.
4. Encourage the development of educational programs and workshops that would take place at Prairie Creek Park.
5. Promote the use of Prairie Creek Park as an outdoor laboratory for educational purposes.

In-depth Explanation of the Objectives

Goal A: Protect and ensure the longevity and availability of Prairie Creek Park and the reservoir for future generations.

Objective 1: Encourage the City of Muncie to pursue extending the lease for Prairie Creek Park with the Indiana-American Water Company.

The members of all three Focus Groups believe that to control the land inside the "ring roads" is the best way to preserve the park, limit development, and maintain reservoir water quality. The current situation whereby the Indiana-American Water Company leases most of the waterfront land to the City of Muncie for use as a park seems to be working well towards that end. The two entities have a good working relationship and similar goals. It seems ideal that this arrangement be extended for the foreseeable future.

Objective 2: Before the land inside the "ring roads" becomes available, establish an agreement for first right of refusal that is embraced by both the City of Muncie and Delaware County.

The current ownership situation at the reservoir with the Indiana-American Water Company owning the land and the City of Muncie leasing it for park use seems optimal. However, should the Indiana-American Water Company wish at some point to sell the land it is strongly suggested that the City of Muncie in partnership with Delaware County work with Indiana-American Water Company to set up an agreement whereby ownership could pass to the city and county while the water company continues to oversee the reservoir and its water. We are recommending that even if ownership changes at some time in the future, that local government and the Indiana-American Water Company both continue to play major roles in the operation of the reservoir.

Objective 3: If the land inside the "ring roads" and/or adjacent IAWC properties goes up for sale, purchase them.

Should the current owner of the land, Indiana-American Water Company, decide to put the land up for sale rather than renew the city's lease, it is recommended that the City of Muncie, perhaps together with Delaware County, whose residents greatly benefit from the recreational value of the reservoir and park, should purchase the land for the purpose of maintaining Prairie Creek Park and the good quality of the drinking water of the reservoir.

Objective 4: Encourage 501(c)3s, non-profit organizations, to help gather resources to defend Prairie Creek Reservoir and the long term transition envisioned in this plan.

It is the premise of this plan that the protection of water quality, ecological health, and recreational opportunities at Prairie Creek Reservoir and Park will be the culmination of decisions made by the entire community. However, non-profit organizations could serve a special role in helping to secure funding, for providing manpower for implementation and championing specific projects outlined in this plan. Non-profit (501(c) 3) groups often have greater opportunity than political subdivisions to obtain grants from the private sector and could assist in fundraising efforts for projects. Also, many

local non-profits are capable of mobilizing volunteers to assist in the physical aspects of project development.

Finally, if a nonprofit "Friends of Prairie Creek" group were to be re-organized, they could serve as local champions of the reservoir, promoting accountability among other groups and agencies that are responsible for carrying out this plan. This plan envisions the realizations of goals that may take many years to fully accomplish and oversight by a non-profit organization interested in the reservoir could help ensure that those goals are achieved. Implementation is the key to making any plan work and non-profit organizations are often key players in making things happen. It is therefore seen as highly desirable that contact with various nonprofit organizations be made and their help elicited in working to achieve the goals set forth in this plan.

Objective 5: Work with relevant existing community entities for the implementation of the objectives in this master plan.

Implementation of the objectives called for in this plan can only be achieved through partnerships between local government, service institutions, private clubs and groups, institutions of learning, public utilities, area land owners, including Indiana-American Water Company, and individuals. The general concern for drinking water quality, recreation and lifestyle amenities make the reservoir's health a goal for everyone. It would be optimal to establish a committee (the Prairie Creek Park Committee) that would act as an oversight/development/program/advisory group to coordinate efforts and explore future possibilities in the area.

The Prairie Creek Park Committee should be formed by the Park Board to help develop future park plans, improve facilities, plan special events and programs, identify future needs and determine solutions. The PC Park Committee could act as an advisory body to the Park Board. Membership could include Park Board members and other interested persons who bring expertise not found on the Board- examples include Muncie Civic Theatre, educators, BSU faculty, Visitor's Bureau staff, nonprofits, etc.

This committee's mission would be to serve as an implementation and oversight body, and as the creative lead to develop programs such as the outdoor laboratory, educational programs and workshops, special events, etc. It should have a marketing function promoting Prairie Creek Park. Also this Committee should push for community involvement and buy-in regarding safe-guarding the Park's future and take a leading position in implementing the Goals and Objectives outlined in this Plan.

Goal B: Protect and enhance the long term ecological health and water quality of the Prairie Creek Reservoir and supporting watershed.

Objective 1: Control developmental impacts in immediate vicinity of the reservoir.

Objective 1a: Rezone the area within the "ring road" to the conservation/recreation zone.

Members of all three focus groups suggested that the area inside the county roads be rezoned to RC, Recreation and Conservation to protect it from future development. The RC Zone as described in the Comprehensive Zoning Ordinance in effect for Delaware County was established "…primarily as a conservation measure to preserve for existing and future generations a part of the ecological balance between man and his natural environment." The Ordinance goes on to say;

> Through the maintenance of certain areas of land devoted to woodlands and best practical conservation uses, much benefit can be derived by many people in the form of diminished air and water pollution and soil erosion, cover for wildlife and flora, and the preservation of natural resources located therein. These designated areas may be located along rivers and streams, the hills, or level areas within the jurisdiction of this Ordinance. Once a Recreation and Conservation Zone is established, the Plan Commission shall take extreme care in making any deviation.

The uses permitted in the Recreation and Conservation Zone principally are forests, woodlands, and best practical agricultural land uses. Other accessory uses and structures that may be in the Recreation and Conservation Zone include recreational lakes, wildlife preserves, public parks, playgrounds, boat landings and docks, and fishing. Residential, industrial and commercial uses would be prohibited under the Recreation and Conservation Zone. The minimum lot size is four acres except for playgrounds which can be one acre.

Objective 1b: Encourage owners of properties outside the "ring roads" that are used, could be used, and/or are land banked for purposes such as habitat preserves, conservation areas, greenspace, and farmland conservation to rezone those properties to the conservation/ recreation zone.

By rezoning properties to the conservation/recreation zone property owners can utilize a local mechanism "established primarily as a conservation measure to preserve for existing and future generations a part of the ecological balance between man and his natural environment."[1] Because this mechanism could play an important part in preserving the natural character in the area, the Plan Commission could offer to do the rezoning for area properties as an incentive.

1 "Delaware County Comprehensive Zoning Ordinance" Delaware-Muncie Metropolitan Plan Commission. p.65.

Objective 1c: Amend local ordinances to ensure that no large scale developments can occur without the existence of sewer and water utilities, or equivalent alternatives.

Proper wastewater treatment and disposal is necessary to maintain good water quality. However, throughout Delaware County there are no soils that are ranked as "not limited" for septic tank absorption fields. In fact, there are only four soils (Martinsville loam, 0-2% slopes; Martinsville loam, 2-6% slopes; Mountpleasant silt loam, 2-6% slopes, eroded; and urban land Wawaka-Miami complex, 106% slopes, eroded) that are rated "somewhat limited" for septic tank absorption fields. All other soils in Delaware County are rated "very limited". This means that anywhere that a septic system is installed in Delaware County there will be increased need for maintenance and poor performance from the system should be expected. (See Appendix B for more information on soils and their properties for sewage disposal).

Therefore members of the DMMPC staff and the Prairie Creek Steering Committee recommend that minimal use be made of septic systems as a means of wastewater treatment in the Prairie Creek Reservoir watershed. Any development on a large scale, such as a platted subdivision, planned unit development, condominiums or cluster development should not occur with the use of individual septic systems. Instead such developments need to utilize alternative on-site wastewater treatment systems (such as cluster treatment systems) or connect to a regional wastewater treatment facility.

Water utilities or alternate drinking water supply should also be explored due to suspected high levels of arsenic found in the ground water.

Objective 1d: Initiate policies and/or amend ordinances as applicable for new development to ensure that no individual on-site sewage disposal sytems (OSDS) may be located within the "ring road" boundary.

Ample evidence exists to the effect that leach fields emit effluent or runoff that is inconsistent with maintaining good drinking water quality (see Appendix A). To ensure that the quality of the water in Prairie Creek Reservoir stays as high as it is today, a moratorium should be placed on construction of septic systems and leach fields near the water body or its direct tributaries.

Objective 1e: Develop and implement a program that is a joint effort between the Bureau of Water Quality and the Delaware County Health Department to investigate and improve, as needed, water quality in the greater New Burlington area.

During the planning process it was discovered that significant wastewater issues exist in the New Burlington area and nearby homes. Clusters of homes on septic can pose a threat to the water quality of the reservoir and therefore warrant special attention. It is essential for residents to be able to learn about proper septic system maintenance, the health ramifications of living with and around failing/ failed septic systems, and alternative sewage/wastewater treatment systems. The Watershed Project's Outreach and Eduction efoorts could serve this function.

It is recommended that the Bureau of Water Quality and the Delaware County Health Department work together to investigate and resolve this water quality issue. The Bureau of Water Quality would

begin the process by testing for E. coli in the greater New Burlington area. If high counts of E. coli are found, Delaware County Health Department would then "dye test" residences to discover where the failing septic systems are. If a large amount of houses are found to have failing systems, it is recommended that residents look into a cluster system or other alternative systems to process their waste. The unincorporated village of New Burlington and homes along County Road 550South, County Road 475East, County Road 450South and County Road 461East should all be included in the plan. Funding sources should continue to be sought to absorb costly solutions.

Objective 2: Reduce sedimentation and accompanying nutrient and pesticide loading in the reservoir.

Objective 2a: Establish and manage constructed wetlands before the bays and inlets of Prairie Creek Reservoir.

The value of wetlands as natural filters has been well-documented. Prairie Creek Reservoir receives waters from five streams on the south and east sides, and an intermittent flow from the west side. Land uses surrounding these flows include agriculture and residential uses. Potential surface-water contaminants in the watershed include nutrients from agricultural field runoff and failed and failing septic systems; pesticides from agricultural runoff; pathogenic bacteria from failed and failing septic systems, livestock, and wildlife; and sediment from row-cropped fields and streambank erosion. Wetlands that receive incoming waters from the feeder streams of the reservoir would serve as a settling basin for sediment and its associated nutrients, pesticides, and bacteria. Further, specific wetland plants could be planted for the uptake of nutrients to prevent further nutrient-loading of reservoir waters. In addition to being surface-water filters, wetlands are also valued as wildlife refuges, groundwater recharge sites, and water storage areas.

Proximity to the Reservoir is an important consideration for these wetlands. The closer the wetlands are to the inlet of the stream, the less potential there is for contamination downstream of the wetland to bypass the wetland and enter directly into the reservoir. However, wetlands higher up the watershed could decrease velocity of waters coming into the reservoir after a rain by storing some floodwaters, decreasing streambank erosion associated with those fast-moving waters, and thereby, decreasing sedimentation entering the reservoir with each storm event. Therefore, the recommendation of this plan is to place wetlands along each of the feeder streams within the watershed, both in the upper-watershed and near the inlets of the reservoir.

A pilot wetland is currently being constructed at the southwest corner of the reservoir by the White River Watershed Project, in partnership with the Indiana American Water Company, the US Fish and Wildlife Service, Ducks Unlimited, and the Robert Cooper Audubon Society.

Objective 2b: Create and maintain 50-foot vegetated buffers around the shoreline of the existing ATV course to mitigate sediment loading and erosion impacts.

Prairie Creek Park maintains a 50-acre all-terrain vehicle course, for use by vehicles such as 4-wheelers and motorbikes, on the south shore of the main body of the reservoir. The course primarily consists of mud paths crisscrossing through hardwood forested lands. Vehicular traffic on the ATV course

paths prevents annual and perennial plants from rooting into the soil over much of the course, hinders the development of leaf-cover that would shelter the soil from rainfall, and deepens gully erosion on the paths, leading to sediment in stormwater runoff from the course.

In order to protect the reservoir from further sedimentation from the ATV course, this plan recommends that 50-foot vegetated buffers be created on the shoreline adjacent to the ATV course. Woody vegetation already extends from the course down to the shoreline. However, at least one path leads down to the water, creating a direct link for sediment to enter the water. This path, and all other paths that are within 50 feet of the shoreline, should be taken out of service and the gully(ies) should be reconstructed. It is further recommended that the Parks Department consult with a soil resource specialist to identify additional measures to mitigate sedimentation resulting from ATV course use.

Objective 2c: Promote conservation farming practices in the Prairie Creek watershed, including best management practices for drainage, nutrient management, pesticide management, soil conservation, surface water protection, tillage/residue management, and waste management.

Approximately 11,000 acres, or 64%, of the Prairie Creek Watershed is in agricultural land use. The potential exists for agriculture to impact water quality in the reservoir if best management practices and conservation farming are not followed. Conservation farming practices protect soil, water, air, and wildlife resources. The United States Department of Agriculture's Natural Resources Conservation Service recommends conservation farming practices for sustainable farming in a variety of circumstances.

Farming practices that could have the most positive impact upon water quality are

- Buffer practices for surface water protection (e.g., filter strips and riparian forest buffers),
- Drainage/run-off management (e.g., grade stabilization),
- Livestock management (e.g., exclusion fencing and stream crossings),
- Nutrient management (e.g., grid sampling, variable rate technology, cover crops),
- Pesticide management (e.g., pesticide management planning, agrichemical handling facility),
- Soil erosion management (especially tillage practices and waterways), and
- Waste management (e.g., comprehensive nutrient management planning and waste storage facilities).

The White River Watershed Project's Watershed Management Plan for Prairie Creek subwatershed calls for an increase in manure and nutrient management, and an increase in conservation tillage. Increased adoption of these practices will decrease sediment, nutrients, and bacteria in the waterways leading to the reservoir.

A list of conservation practices that have a bearing on water quality is included in Appendix D.

Objective 2d: Restore areas where erosion has occurred.

Erosion within the watershed results in sedimentation in the waterways leading to Prairie Creek Reservoir and within the reservoir itself. Sediment has been ranked as the number one pollutant

in Indiana's waterways. When it settles out, sediment covers up fish and macroinvertebrate habitat, smothers macroinvertebrates, and hinders hunting in sight-predators. In addition, sediment can carry other contaminants, such as nutrients, pesticides, and E. coli with it, causing further pollution. Because of the importance of Prairie Creek Reservoir as a supplemental drinking water and recreation source, it is important that water flowing into the reservoir is of as high quality as possible. Therefore, this plan recommends that an erosion assessment be carried out on the watershed and that eroded areas be restored.

Major sources of erosion that would likely contribute to sedimentation in Prairie Creek Reservoir include:

- Stream/ditch banks, due to increased flow velocity, stream crossings, gullies from fields, removal of woody vegetation from banks;
- Agricultural fields, especially those that are conventionally tilled;
- Developments where stormwater runoff best management practices are not in place or are not effective;
- Prairie Creek Reservoir shorelines, due to wave action and non-motorized boat access as well as wildlife access points; and
- Dirt trails, including the horse trail and any dirt access roads in the watershed.

Potential strategies for restoring these areas include:

- Working with the Delaware County Surveyor's office to stabilize ditchbanks of legal drains;
- Restoring tree cover or grass filter strips to riparian areas;
- Working with local landowners to construct localized stream crossings for livestock and motorized vehicles;
- Install grassed waterways and other solutions to gully erosion in agricultural fields;
- Promote reduced tillage to producers who conventionally till their fields;
- Work with landowners to construct best management practices for stormwater runoff in residential and commercial areas;
- Install bulkheads and/or seawalls on the most vulnerable shorelines of Prairie Creek Reservoir;
- Install non-motorized boat access points to the reservoir; and
- Stabilize dirt trails with permeable substrate such as wood chips, crushed limestone, or gravel.

Objective 2e: Promote the establishment of 120-foot wide vegetated buffers on each side of streams and ditches with permanent flows, and 20 to 30-foot wide buffers on each side of intermittent streams and ditches in order to reduce sediment and nutrient loading to maintain acceptable levels in the reservoir for human recreational use.

Prairie Creek Reservoir receives water from several streams and ditches in the watershed, as well as run-off from its shoreline. As a reserve drinking water reservoir, it is important that water flowing into the reservoir is of as high quality as possible, while still allowing for the recreational use of the Park. Water flowing from upland areas into the tributaries could be slowed and filtered by vegetated buffers lining the banks. Roots, leaves, and stems of woody and herbaceous vegetation impede water flowing through them, allowing infiltration, settling of sediments, and plant uptake of nutrients. Wider

buffers have more time to filter water and slow its progress to the stream. Over the width of the buffer, water will infiltrate the soil to contribute to groundwater recharge; and vegetation will remove nutrients that have percolated into the soil. Plant roots also hold streambank soils and protect against bank erosion.

In addition, riparian forest buffers shade the water below, decreasing stream temperatures and increasing dissolved oxygen. The amount and types of aquatic species in a stream are directly related to the amount of dissolved oxygen available. Shaded streams are also less susceptible to algal blooms due to the low penetration of sunlight. The importance of minimizing algal blooms is related to the algae's ability to consume all available dissolved oxygen and kill other aquatic life during blooms.

Suitable vegetation for buffer strips includes primarily trees, shrubs, and grasses. Several species of legumes may also be added to the mix. Trees included in riparian forest buffer are typically flood-tolerant species and should include some species with high shade value. Warm and cool season grasses with deep root systems could be utilized as filter strips in areas with less than 10% slopes.

This plan recommends that all permanently-flowing streams and ditches be lined with a 120-foot woody or herbaceous buffer. This recommendation is based upon 1) the maximum filter strip width for which the United States Department of Agriculture's (USDA) Farm Services Agency will pay landowners; and 2) the recommendation of Young, Huntrod and Anderson, whose research published in 1980 estimated that 118-foot riparian buffers would be required to reduce pathogens, including coliform bacteria, for waters that will be utilized for human recreation. In addition, this plan recommends a 20-30 foot buffer for streams of intermittent flow. The USDA Natural Resources Conservation Service (Indiana) recommends that buffer strips be no less than 20 feet wide to be effective in filtering nitrates and slowing the progression of runoff water.

Traditionally, cost-share programs for the installation of filter strips and riparian forest buffers have been available through the USDA, Indiana State Department of Agriculture, and local Soil and Water Conservation Districts.

See Appendix E for recommended species for filter strips and NRCS design specifications.

Objective 3: Develop and promote a program to educate people about: 1) proper on-site wastewater treatment system maintenance, 2) the health ramifications from failed/failing individual on-site wastewater treatment systems and 3) alternative sewage/wastewater treatment systems.

Septic systems require proper design, construction and maintenance in order to operate properly. A septic system that is not functioning properly pollutes water and can be a health hazard. Many people are unaware of septic system maintenance needs and therefore many systems are poorly maintained. A program is recommended to inform the public to septic system issues and to educate people regarding the use, care and maintenance of their septic systems. People should also be informed about alternative sewage/wastewater treatment systems that may be more cost-effective and offer better longevity. Other programs need to be developed to address the needs that result from increased septic health awareness.

Objective 4: Support/enhance enforcement of existing laws (410 IAC 6-8.1) governing residential on-site sewage disposal systems, including options for funding relief.

Homes and businesses that are not on public sewers can be major contributors to water pollution if they do not have properly functioning sewage disposal systems. Laws currently govern the discharge of wastewater and solid wastes into streams, ditches and onto the ground. For a variety of reasons those laws are sometimes not enforced allowing contamination of surface water that ends up in the reservoir. Since enforcement is often complaint driven, a concerned citizen group may need to make those complaints.

Bringing a failed system into compliance can also result in a variety of issues including but not limited to 1) having enough uncompromised and viable land to support a replacement on-site sewage disposal system (OSDS) and 2) the cost of bringing a failed system into compliance can be more than some residents can afford. Thus it is recommended that an OSDS Committee is formed by the County Commissioners in order to strategize solutions for assisting property owners with failed OSDSs.

Objective 5: Increase biodiversity in and around the reservoir.

Objective 5a: Establish a Land Restoration-Revegetation Management Plan.

The Land Restoration-Revegetation Management Plan should be established in order to:

- Restore and enhance the natural character of the land within the viewshed of the "ring roads" and designated routes for accessing Prairie Creek Reservoir.
- Mitigate and restore areas with erosion.
- Restore and enhance the character of Prairie Creek Park.

Figure 34 represents the viewshed from the "ring roads" around Prairie Creek Reservoir. The viewshed illustrates primary areas to naturalize. To implement the land restoration-revegetation management plan, a cost-share program should be initiated that will assist property owners that would like to contribute to the overall natural character of the area around the reservoir. Property owners would be assisted with the cost of revegetating areas within their properties that affect the viewshed from the "ring roads" as long as they plant species recommended through the cost-share program.

Many areas throughout Prairie Creek Park are affected with erosion. In order to protect the buffer surrounding Prairie Creek Reservoir, eroded areas must be mitigated and restored.

This management plan will:

- Identify native plant communities for a Cost-Share Program that would assist landowners with returning the roadside portion of their properties to a natural state.
- Identify revegetation scenarios that will address erosion issues affecting the buffer around Prairie Creek Reservoir.
- Identify invasive/undesirable (target) species for removal.
- Recommend maintenance measures.

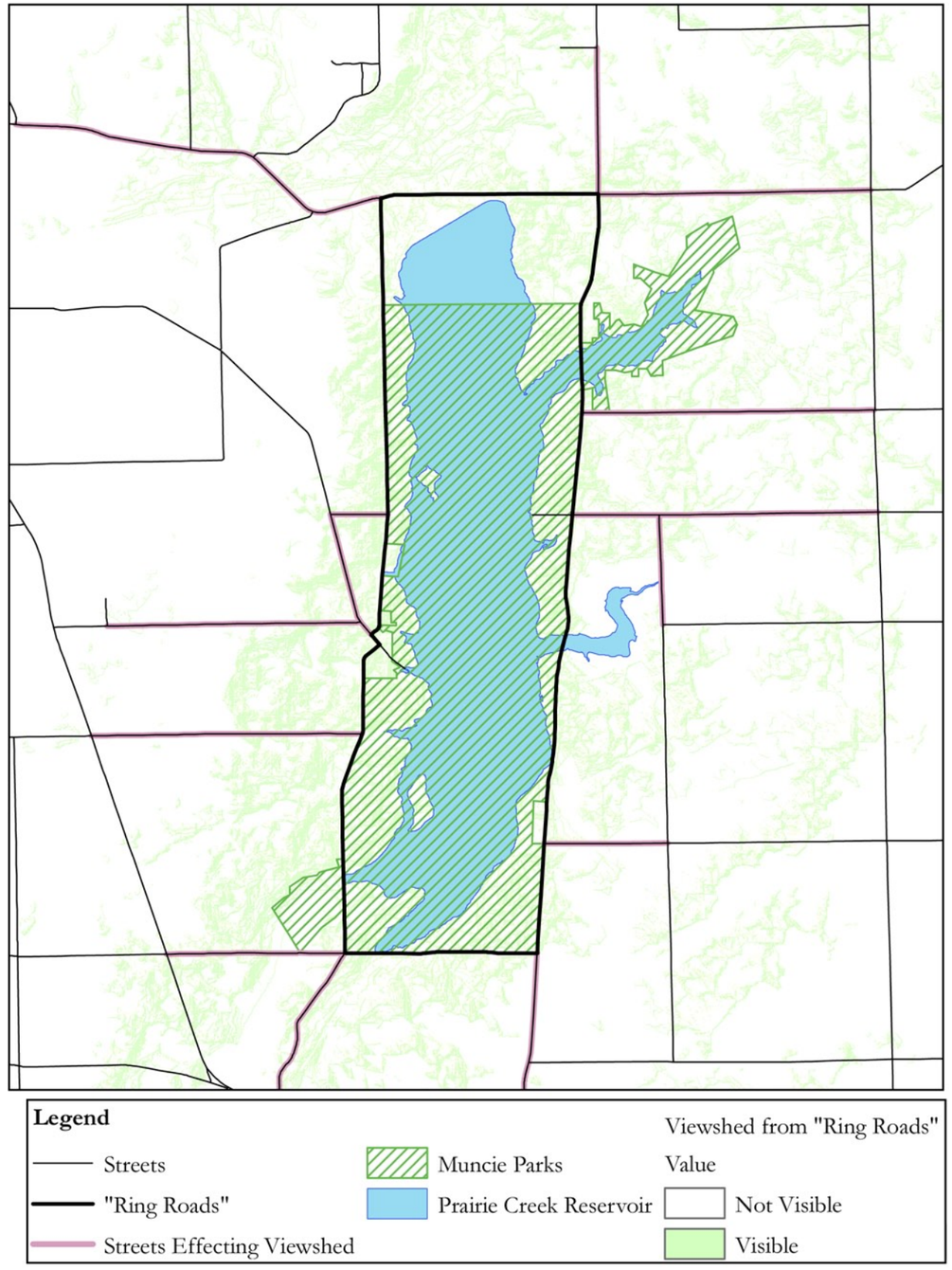

Figure 34: Viewshed from the "ring roads."

Objective 5a-i: Establish a Flora Assessment Study.

This study should be established in order to assess the flora within the "ring roads" at Prairie Creek Reservoir. This study is necessary in order to determine:

- What species are there?
- Are there significant specimens worth protecting?
- Are there significant plant communities that should be protected?
- Do significant specimens occur in a pattern that should be protected and/or even highlighted through design?
- Are there areas, beyond those already identified, which should be designated as "to be enhanced, restored or revegetated"?
- What types of plant communities (scenarios) should be used to enhance, restore or revegetate designated areas?
- Are there plant communities that could be used to enhance scenic views?

Establishing a partnership with Ball State University to conduct this study would be logical and beneficial. This type of study would be logical since BSU employs professional botanists and ecologists; and mutually beneficial in that it could provide graduate projects for several departments while minimizing costs for the party responsible for implementing the study. From brief discussions it seems that this study would be attractive to the Landscape Architecture Department, the Biology Department, and the Natural Resources Department. By necessity, the project would be long term with the first phases concentrating on areas that need to undergo remediation (i.e. the ATV site) or for areas that could be attractive for development. In addition it is the recommendation of this Master Plan that this study be completed before any development could occur.

Objective 5a-ii: Restore, enhance, and reestablish the historical native plant communities of the Tipton Till Plain in the area surrounding Prairie Creek Reservoir.

The Prairie Creek Watershed is found within the Tipton Till Plain section of the Central Till Plain Natural Region. This section is home to the Central Till Plain Flatwoods, a natural community found on the list of endangered, threatened, and rare species documented in Delaware County, Indiana (see Appendix C). Due to the status of this natural community, it is recommended that efforts be taken to restore, enhance, and reestablish this historical native plant community. Species belonging to the Till Plain Flatwoods community should be primary species recommended in the Land Restoration-Revegetation Management Plan, where appropriate.

Objective 5b: Create wetland and improve aquatic habitats in Prairie Creek Reservoir to increase biodiversity.

Prairie Creek Reservoir and the area within the "ring roads" are used by many different species of fish and wildlife. Because fishing and ecotourism (e.g. bird watching) are so important to the support of the reservoir, this plan recommends that wetlands are created and aquatic habitats improved in Prairie Creek Reservoir to increase biodiversity, and thereby, increase opportunities for recreation, education, and environmental stewardship.

The majority of fish species within the reservoir are game fish, as fishing is an important recreational activity at the Reservoir. Currently, the Reservoir contains gizzard shad, walleye, largemouth bass, white crappie, smallmouth bass, channel catfish, flathead catfish, perch, bluegill, red-ear sunfish, carp, and possibly a few surviving sturgeon from stocking years ago. It is anticipated that game fish will continue to be stocked. These types of fish need shallow water to spawn and prefer some type of structure, such as submerged stumps, rock piles, or weed beds, as hang outs. Many of these fish are sight-predators and require relatively clear water to hunt.

The aquatic habitat available in the reservoir currently includes shallows, open water, and structures, including fallen logs, weed beds (summer), and rock piles. The lake bottom is dotted with submerged islands from former building foundations. Much of the lake substrate is muck, due to sediment migration from the feeder streams. Improvement measures could include the addition of lilly-pad beds, and supplementary fallen logs and rock piles to provide cover for game fish. Continued sedimentation of the lake bottom could be managed by installing additional filter strips upstream of the reservoir and/or installing a sediment trap at the mouth of feeder streams. Excessive "weediness" could also be controlled by filter strips upstream and mechanical harvesteing

Other wildlife, such as spring peepers, chorus frogs, blue herons, double-crested cormorants, belted kingfishers, Canada goose, gulls, white cranes, and loons, are known to inhabit and utilize the lake area. Waterfowl and amphibians would benefit from the creation of wetlands for habitat in the lake. Shallow areas in the south end of the lake would be a good location for these wetlands.

Goal C: Ensure good design reflecting sound ecological practices for new development and redevelopment in the watershed.

Objective 1: Amend local ordinances to ensure that no large scale developments can occur without the existence of sewer and water utilities, or equivalent alternatives.

Proper wastewater treatment and disposal is necessary to maintain good water quality. However, throughout Delaware County there are no soils that are ranked as "not limited" for septic tank absorption fields. In fact, there are only four soils (Martinsville loam, 0-2% slopes; Martinsville loam, 2-6% slopes; Mountpleasant silt loam, 2-6% slopes, eroded; and urban land Wawaka-Miami complex, 1-6% slopes, eroded) that are rated "somewhat limited" for septic tank absorption fields. All other soils are rated "very limited". This means that anywhere that a septic system is installed in Delaware County, there will be increased need for maintenance and poor performance from the system should be expected. (See Appendix B for more information on soils and their properties for sewage disposal).

Therefore members of our staff and Steering Committee recommend that minimal use be made of septic systems as a means of wastewater treatment in the Prairie Creek Reservoir watershed. Any development on a large scale, such as a platted subdivision, planned unit development, condominiums or cluster development should not occur with the use of individual septic systems.

Water utilities or alternate drinking water supply should also be explored due to suspected high levels of arsenic in the ground water.

Objective 2: Develop an ordinance amendment requiring all new housing developments in the Prairie Creek Reservoir area to meet conservation design standards.

An ordinance amendment making the use of conservation design standards mandatory inside the watershed should be made to ensure the future drinking water quality of Prairie Creek Reservoir, to protect groundwater in general, and to protect the natural character of the area.

Objective 3: Establish model plat restrictions that ensure sound ecological practices, and require their use on any land in the area that gets platted.

Sound ecological practices are essential to maintaining future drinking water quality. Landscaping, drainage, impervious surfaces and wastewater treatment and disposal are areas that impact water quality and merit the establishment of guidelines that follow best practices. Guidelines for platted areas should be established and their inclusion made a mandatory part of the platting process, much the same as the "right to farm" restrictions have been used.

Objective 4: Encourage private landowners to use model plat restrictions as deed restrictions to ensure sound ecological practices on individual properties.

Water quality in the Prairie Creek watershed depends on the cooperation of individual landowners as well as developers, government and utility companies. It is therefore advised that best practice guidelines be made widely known and the general public educated regarding their use. Landowners

in the watershed should be encouraged to place covenants on their land to ensure that future land owners follow the same sound ecological practices.

Objective 5: Encourage and enforce best management practices for sediment reduction during construction in the watershed.

Stormwater runoff from construction sites during new development and redevelopment can deposit significant amounts of sediment into adjacent and downstream watercourses if best management practices (BMPs) for soil erosion during and after construction are not implemented. Sediment has been ranked as the number one pollutant in Indiana's waterways. When it settles out, sediment covers fish and macroinvertebrate habitat, smothers macroinvertebrates, and hinders hunting in sight-predators. In addition, sediment can carry other contaminants, such as nutrients, pesticides, and E. coli with it, causing further pollution.

Indiana's Rule 5 requires that any developer planning construction (new development or redevelopment) that will disturb more than one acre of land must file an erosion control plan with appropriate BMPs with the local regulating authority and Notice of Intent (NOI) with the Indiana Department of Environmental Management before land disturbing activities can occur. Plans must meet sufficiency standards as outlined by 327 IAC 15-5-6.5. Contractors must comply with the provisions of the plan during construction activities. Inspection of construction sites is typically carried out at the local level, with violations of the plan enforceable by the Indiana Department of Environmental Management.

In addition, local regulations apply, Delaware County Ordinance 2006-35 and Muncie Sanitary District Resolution 2006-12. Delaware County and the Muncie Sanitary District are permitted separate storm sewer system (MS4) operators under the National Pollution Discharge Elimination System (NPDES) and control stormwater discharges within unincorporated Delaware County and the Muncie Sanitary District. Any new development or redevelopment within these areas will fall under the jurisdiction of the Muncie Delaware County Department of Stormwater Management and must file a storm water pollution prevention plan (SWPPP) for review in the Delaware County Building Commissioners Office. Once local plan approval has been received, an NOI must be filed with IDEM by the developer. Within 48 hours of land disturbing activities, the local department must also receive a copy of the NOI and a notice that construction will begin. The MS4s have developed a stormwater quality management plan (SWQMP). Minimum Control Measure #4 in the SWQMP describes suggested construction site runoff BMP's. These BMPs include:

- Construction Site Planning Practices (e.g., plan development to fit the topography, soils and other conditions of the site)
- Soil Cover (e.g., use of soil stabilizers, installation of vegetative debris over exposed soil)
- Tracking Control (e.g., mandatory construction entrance, constructed tire wash areas)
- Structures to Control and Convey Runoff (e.g. earth dikes, swales)
- BMPs to Capture Sediment (e.g. filter strips, sediment basins)
- Good Housekeeping (e.g., spill control, protected refueling stations)

Post-construction erosion control is also regulated by the Muncie-Delaware County Department of Stormwater Management under the above mentioned Ordinance and Resolution. Post-construction

runoff BMPs also include planning, structural, vegetative, and good housekeeping practices.

Monitoring carried out by the White River Watershed Project indicates that sedimentation (as measured by total suspended solids) in the watershed is within acceptable ranges. In order to maintain these low levels of sedimentation, this plan recommends that the use of BMPs for sediment reduction in new development and redevelopment under one acre is encouraged. This plan also recommends that the use of BMPs for sediment reduction in new development and redevelopment over one acre in the subwatershed is enforced. In addition, this plan suggests accurate review of BMPs outlined in erosion control plans and education for those expected to use them.

Objective 6: Amend or adopt local ordinances to require that lots are of sufficient size to accommodate both the initial OSDS and repair/replacement space; both spaces must remain uncompromised and viable.

There are local and state ordinances administered by the Health Department that govern requirements for on-site sewage disposal systems. In order to meet some of those requirements, the area intended for installation of the system must remain undisturbed. The local zoning and subdivision control ordinances contain lot size requirements to accommodate an initial on-site sewage disposal system but the requirements do not address allowing enough area for the repair/replacement. The requirements also do not contain provisions that would support keeping the area undisturbed. Ordinance amendments should be adopted to require lot areas sufficient for both the initial system and a replacement. Provisions could also be added requiring the use of OSDS easements, similar to drainage easements where standard restrictions prevent disturbance, alteration, and/or structures to be placed in the easement area.

Objective 7: Protect existing on-site sewage disposal systems that are not in failure.

Objective 7a: Require all on-site sewage disposal system repairs to meet new construction standards for on-sitesewage disposal systems.

On-sitre sewage disposal systems (OSDS) can be a major source of water pollution if not designed, installed and maintained properly. Although there is some variability in the life-span of an OSDS, most systems do not last as long as the homes they are servicing. Repairs are therefore to be expected and should be planned for. Older system designs often emit effluent that doesn't meet current standards for wastewater quality, even when working properly. Therefore repairs to existing systems should be done using the best up-to-date technology and bring older systems up to current standards. It is recommended that OSDS installation and repair should be governed by a permitting process and done only by licensed contractors using modern technologies.

Objective 7b: Adopt an ordinance that requires all building permits to include an on-site sewage disposal system review by the Health Department.

In order to improve septic health in existing scattered sites as well as new development, the building permit process should be amended to include review by the Health Department of any permit application

for additions or non-residential structures. Septic system capacity is an important consideration when adding bedrooms and making other improvements that may impact total maximum dynamic load. Conservation measures can often be taken to reduce the load on the system. In severe cases where systems are inadequate, the on-site sewage disposal system may need to be upgraded before the building improvements can be permitted.

Protection of the septic system itself is also vital. The owner(s) and contractor should be aware of the location of the septic system to avoid causing damage such as from heavy equipment.

In order to review both a building project and on-site sewage disposal system, scaled site plans should include: the building's floor plan, contours, lot line dimensions, additional structures (driveways, parking areas, or other improvements), trees to remain in the absorption area; location of underground services, easements, wells (existing and proposed), soil test sites, septic tank, absorption fields, perimeter drains, distances between trenches, and distances from the septic tank to foundations, lot lines, wells, water lines, lakes, ponds, streams, wetlands, floodplains, drainage ditches and other surface water.

Objective 8: Amend local ordinances to coordinate the requirements/permitting processes for stormwater control when soil types require perimeter drains for an OSDS.

More often than not, onsite sewage disposal systems require perimeter drains in order to function properly. In addition to high water table issues, stormwater must also be considered. The outlet for a perimeter drain system is as important to its function as it is to any storm drain system. Perimeter drain outlets should be treated similarly to outlets for storm drains – there should be easements, capacity reviews, and approvals for connections. In addition to function, it is important that those drains be of sufficient depth and correct design to maintain water quality. There should be coordination between standard drainage permits, perimeter drain installations, and erosion control/stormwater quality requirements by reviewing and amending local ordinances under the health department, the engineering department and the MS4 program.

Goal D: Promote the full potential of Prairie Creek Reservoir as a community asset with regional appeal.

Objective 1: Expand promotion of Prairie Creek Park as a visitor destination.

Marketing strategies should be developed that advertise and promote the facilities available at the Prairie Creek Park. The survey results indicate that many people are unfamiliar with what is currently available at the park and most people first learn about the park through word-of-mouth. Marketing to target groups such as bikers, hikers, horseback riders and fishermen could bring new visitors to the park. Highlighting the seasonal changes at the park would help people appreciate the reservoir year-round and increase the return on the community's investment.

Objective 2: Develop and enhance wayfinding and marketing devices, including signage, maps, brochures, and websites, to assist people in locating Prairie Creek Reservoir and educating the public about available recreational opportunities.

There should be more marketing of the park and existing facilities and the opportunities currently available in the area. A park brochure would assist in making people aware of what Prairie Creek Park has to offer and help orient first time visitors. Event attractions require publicity to make them a success and by holding such events at Prairie Creek, people would become more aware of the facilities and be more likely to visit the Park for the first time. Targeting groups with an interest in outdoor activities, camping, fishing, boating and horseback riding could bring visitors from a wider regional area. Improved directional signage to help locate the reservoir is in the works and is essential for the success of any event which brings numbers of people from outside the Muncie community. A separate web address for the Park should be considered. Links to this website should be made from both the City & County government's websites as well as from the websites for the Chamber of Commerce and the Visitor's Bureau.

Objective 3: Promote the development of special events that enhance the community service/amenity value and the attraction destination/economic development potential at Prairie Creek Reservoir.

The biggest annual event at Prairie Creek Park is the 4th of July fireworks. Special events like the Endurathon bring hundreds of visitors to Prairie Creek Park and the Muncie community. The Greenway Giddy-Up is a weekend of horseback riding and camping. The facilities that exist at Prairie Creek could support even more special events. Suggested additions include concerts, fishing and boating competitions, and various workshops.

The Endurathon and the Giddy-up reflect public/private partnerships. That model could be expanded by existing non-profits into other programs such as children's theater productions or talent shows. Furthermore a Frisbee golf course could be laid out as a permanent attraction and be used for competition.

Objective 4: Establish fair regulations for campers that encourage attractive short-term use of campsites at Prairie Creek Park.

The Prairie Creek Park campground together with the boat docks constitute major financial assets for the park and offer visitors an opportunity to maximize their enjoyment of the reservoir. The use of these facilities should be viewed as a privilege. Fair regulations that meet the needs of all should govern their use. It is important that the individual sites and the campground in general be maintained in an attractive, orderly condition so that the park's good image is upheld. The availability of short-term camping (1-14 days) allows for the promotion of the park as a visitor destination and for a wider range of use by local residents.

Objective 5: Capitalize on and promote an opportunity for unique overnight accommodations.

The reservoir and area attractions are a significant destination for many visitors. By providing overnight accommodations in the immediate area, the unique experience of the reservoir would be enhanced. The exact nature of the overnight facilities could take the form of individual cabins or a lodge (preferably at the north end of the park for closer proximity to public sewers). Development of scattered site Bed & Breakfast operations should be encouraged. The added choices available to visitors and opportunity to host events involving these accommodations would further diversify the amenities and charm of the reservoir as a unique area destination.

Objective 6: Encourage the development of a specialty restaurant located on the east side of the reservoir with views of the Sailing Club.

Members of the Economic Development Focus Group believe that a potential exists for a waterfront restaurant placed so that it would take advantage of one of the nicer views at the reservoir. The high ground on the north bank of the inlet that the sailing club uses affords one of the nicer views on the reservoir. It was felt that a potential exists here to develop a restaurant that could serve as a regional draw to the reservoir. Members recognized that there was a local place to eat already at the reservoir and emphasized that the waterfront restaurant would need to have a good menu and nice decor, something that would draw people from outside the local area. In general it is recommended that when demand for commercial resources increases that need be met by clustering any new use near or adjacent to existing commercial areas. This is consistent with the Comprehensive Zoning Ordinance in effect for Delaware County and with good zoning practice.

Objective 7: Investigate the feasibility of design standards, overlay districts, planned unit developments, etc. that provide a mechanism to maintain and to capitalize on (from an economic development standpoint) the rural, naturalized character of the Prairie Creek area.

The possibility of implementing additional measures dealing with conservation of the rural and natural character of the Prairie Creek Reservoir area should be explored. Support may exist for design guidelines to be developed and encouraged for use with any new conventional development or for more visionary development projects. This could take the form of establishing standards that are

consistent with the existing character of the built environment and compatible with the natural setting of the reservoir area. A variety of creative measures could be taken to help realize a vision that may take the shape of a specialized community, large residential estates, a theme development or other innovative design that, in an appropriate low density manner with planned conservation/preservation areas, could become part of the attraction and draw of the Prairie Creek area.

Objective 8: Investigate the feasibility of a conference center/hotel that capitalizes on the natural character of the Prairie Creek area.

The Prairie Creek area offers a natural atmosphere that could be very conducive for a distinctive conference center/hotel/lodge. It is recommended that the PC Park Committee look into the feasibility of locating a conference center near Prairie Creek Park so that conference attendees could utilize the park's amenities. The north area offers proximity to sewers, a commercial node and access to park facilities and other naturalized areas.

Goal E: Provide ample opportunity for recreational use and development of Prairie Creek Park facilities.

Objective 1: Balance the recreation needs for active and passive activities at Prairie Creek Park.

Prairie Creek Park has a plethora of opportunities for a range of activities, both active and passive. Passive activities are those that impose little or no impact on the landscape and frequently involve a very small number of people. Activities such as hiking, horseback riding, bird watching and fishing are considered passive. Active recreation activities are those that have some significant impact on the landscape, either through the need for facilities and equipment or involve significant numbers of people at a time. They would include sporting and entertainment special events, playground activities, swimming, basketball, volleyball, horseshoes and boating. Currently visitors to Prairie Creek Park can choose from a variety of active recreation to engage in, however there are only a few opportunities to engage in passive recreation.

The Recreation Focus Group recommended that, in terms of recreation, the reservoir be viewed as an east bank devoted to active recreation and a west bank reserved for passive activities. Passive activities would not be limited to the west bank and could also occur on the east bank. By creating this juxtaposition of use, the western bank would gain use while maintaining its natural character and the eastern bank would absorb any additional need for development. Thus it is recommended that the Prairie Creek part of the Muncie Park Plan address a site development strategy that maintains a balance whereby the west shore, excepting the ATV course, be devoted to passive recreation in order to preserve the undeveloped character that currently exists there. Should the need to expand the ATV course arise, the ATV course should be relocated outside of Prairie Creek Park.

Objective 2: Develop walking/bicycle trails that encircle Prairie Creek Reservoir.

Creating walking/bicycle trails that encircle Prairie Creek Reservoir is an important opportunity to allow park visitors to appreciate this resource's natural features. A trail system would provide great recreational opportunities in conjunction with the opportunities it would offer for enjoying nature. This trail system should be kept separate from the horse trails and from the "ring roads." The only areas that the trail system should meet the "ring roads" would be to utilize shared bridges where waterways must be crossed. The trail system should maintain connectivity by providing access to the Cardinal Greenway. It should have an unpaved surface such as crushed limestone with strategically placed bike racks and signage.

Objective 3: Retain and enhance the separate trail system for horseback riders.

West bank trail users including the Muncie Light Horse Club have a long history of helping maintain the integrity of the west bank and the horse trails that are it's principal recreational use. Currently the west bank uses are devoted to passive recreation that has very minimal impact on the "natural" state of that area. Any significant development on the west bank would be inconsistent with the desire to keep that area in an undeveloped and "natural" state and would impair the overall appeal of the reservoir. Officers of the Muncie Light Horse Club have indicated that there is a danger in mixing

horses and bikers and pedestrians. It is therefore recommended that any trails that are built for bikers and pedestrians on the west side be separated from those devoted to horseback riding.

Objective 4: Design children's play areas that emphasize learning and connections to the natural environment.

The reservoir offers a unique area in our community to explore the relationship between water and nature. It is recommended that playground facilities be designed that take advantage of this relationship. This could take the form of a ride designed like a fish or aquatic insect such as a dragonfly, for smaller children, and for older children animal footprints or fossils in pavement. Upgrades are needed to existing playground facilities and replacement equipment could follow the nature theme.

Objective 5: Provide an access area for non-motorized boats.

A need for parking and launching non-motorized boats was identified. Non-motorized boats such as canoes and kayaks do not require the facilities at the boat launch and may experience significant wait and some danger when attempting to use that facility. A small pervious surface parking area and path to the water could be of more use to users of such small craft providing a safe, easy access to the water and relieving some of the traffic at the boat launch on busy days.

Objective 6: Comply with ADA (Americans with Disabilities Act) standards for a "natural park."

Prairie Creek Park should be in compliance with ADA Standards. The Standards should be consulted and measures taken to correct any oversights. The Standards differ with regard to "improved" areas including buildings and "natural" areas. Trails may be "improved" or "natural," depending on their surface and construction. The ADA standards indicate that paved trails need to be accessible, but that "natural" trails do not if doing so would destroy part of the natural ruggedness or experience of the trail.

Objective 7: Promote the establishment of 120-foot wide vegetated buffers on each side of streams and ditches with permanent flows, and 20 to 30-foot wide buffers on each side of intermittent streams and ditches in order to reduce sediment and nutrient loading to maintain acceptable levels in the reservoir for human recreational use.

Prairie Creek Reservoir receives water from several streams and ditches in the watershed, as well as run-off from its shoreline. In order for the reservoir to continue to support recreation such as swimming, boating, and game fishing, sedimentation, nutrification, and excessive weediness must be controlled in the main body of the reservoir. These conditions would be most effectively remedied in the upper watershed by placing vegetated buffers alongside feeder streams and ditches.

Water flowing from upland areas into the tributaries could be slowed and filtered by vegetated buffers lining the banks. Roots, leaves, and stems of woody and herbaceous vegetation impede water flowing through them, allowing infiltration, settling of sediments, and plant uptake of nutrients. Wider buffers have more time to filter water and slow its progress to the stream. Over the width of the buffer,

water will infiltrate the soil to contribute to groundwater recharge, and vegetation will remove excess nutrients that have percolated into the soil. Plant roots hold streambank soils and protect against bank erosion.

Suitable vegetation for buffer strips includes primarily trees, shrubs, and grasses. Several species of legumes may also be added to the mix. Trees included in riparian forest buffer are typically flood-tolerant species and should include some species with high shade value. Warm and cool season grasses with deep root systems could be utilized as filter strips in areas with less than 10% slopes.

This plan recommends that all permanently-flowing streams and ditches be lined with a 120-foot woody or herbaceous buffer. This recommendation is based upon 1) the maximum filter strip width for which the United States Department of Agriculture's (USDA) Farm Services Agency will pay landowners; and 2) the recommendation of Young, Huntrod and Anderson, whose research published in 1980 estimated that 118-foot riparian buffers would be required to reduce pathogens including coliform bacteria for waters that will be utilized for human recreation. In addition, this plan recommends a 20-30 foot buffer for streams of intermittent flow. The USDA Natural Resources Conservation Service (Indiana) recommends that buffer strips be no less than 20 feet wide to be effective in filtering nitrates and slowing the progression of runoff water.

Traditionally, cost-share programs for the installation of filter strips and riparian forest buffers have been available through the USDA, Indiana State Department of Agriculture, and local Soil and Water Conservation Districts.

See Appendix E for recommended species for filter strips and NRCS design specifications.

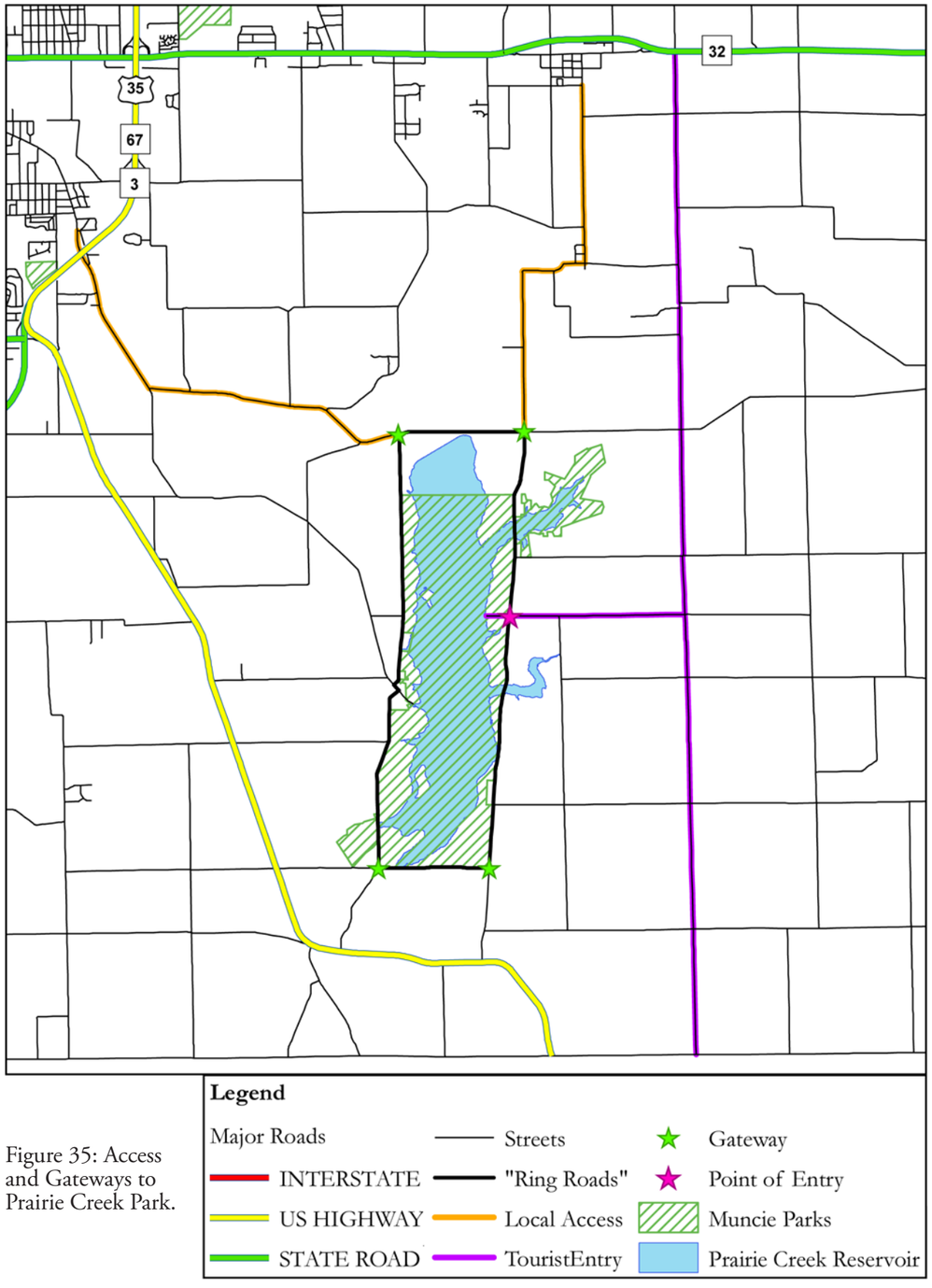

Figure 35: Access and Gateways to Prairie Creek Park.

Goal F: Increase quality of life for residents of Delaware County and enhance visitor experience by improving accessibility, usability and enjoyment of the reservoir.

Objective 1: Improve visitor access to Prairie Creek Reservoir.

Objective 1a: Designate a point of entry and gateways for Prairie Creek Park.

A point of entry or gateway into the reservoir area would help define the reservoir as a destination. Having a primary point of entry would also be helpful to tourists to the area. However, access points surround the reservoir & Prairie Creek Park and roads approach the reservoir & Prairie Creek Park from all directions. Therefore multiple secondary gateways should also be designed with a common theme to let the visitor know that they have arrived. Signage is an important part of the secondary gateways to direct visitors to their intended destinations within Prairie Creek Park. It is noted that the south visitor entry off of US 35 will require coordination with Henry County as well as INDOT.
See Figure 35 on page 110.

Objective 1b: Designate route(s) for best access.

To improve visitor access to Prairie Creek Reservoir, routes for best access need to be designated. Since the reservoir & Prairie Creek Park attract visitors from a range of locations, various access routes need to be designated. Routes from the City of Muncie, Selma & SR 32, and from US 35 should be explored since these represent principle locations that visitors travel from and primary roads that visitors would travel on for access to Prairie Creek Park.
See Figure 35 on page 110.

Objective 1c: Make needed road improvements.

Once routes that provide the best access to the reservoir & Prairie Creek Park have been identified, those roads should be enhanced with 3R improvements (Resurface, Rehabilitate, Restore). It may be necessary and appropriate for local government to fund these road improvements as they stand to directly benefit the community and economic development in the area by improving access to a major water attraction with regional appeal..

Objective 2: Promote bike and pedestrian use of Prairie Creek Reservoir.

Objective 2a: Develop bike and pedestrian trails that encircle the reservoir.

Creating walking/bicycle trails that encircle Prairie Creek Reservoir is an important opportunity to allow park visitors to appreciate this resource's natural features. A trail system would provide great recreational opportunities in conjunction with the opportunities it would offer for enjoying nature. This trail system should be kept separate from the horse trails and from the "ring roads." The only areas that the trail system should meet the "ring roads" would be to utilize shared bridges where waterways must be crossed. The trail system should maintain connectivity by providing access to the Cardinal Greenway.

Objective 2b: Include bike lanes in the needed improvements to the road structure of the "ring roads."

It is recommended that new road construction around the reservoir shall include bike lanes. While bike lanes are typically urban features, providing bike lanes on the "ring roads" would provide a unique recreational opportunity. This would also enhance the "ring roads" for events such as the Annual Muncie Endurathon.

Objective 2c: Install pervious surface parking facilities adjoining bike trails for park and pedal opportunities in the park.

In order to maximize access to the bike and pedestrian trails it is recommended that various small scale parking areas be designed and placed at strategic locations to better accommodate use. The parking areas should be attractive and constructed of pervious materials so they will not add to storm water runoff.

Objective 2d: Connect trail system to Cardinal Greenway.

Capitalizing on the success of the Cardinal Greenway, trails and bike lanes, both existing and planned, should make logical and useful connections. A comprehensive system of walking trails and bike paths should be completed that would make accessible the variety of natural and manmade landscapes that make up the park. Connections should be made between the existing infrastructure as well as any future improvements.

Objective 3: Use Prairie Creek Reservoir as a focus to educate the public about environmental issues including water quality, compatible development, and wildlife habitat needs.

Prairie Creek Park and the reservoir area are unique resources to our area and offer special opportunity to study and interact with water and nature. The nearest similar facility is Summit Lake State Park in Henry County. In order to provide local education on environmental issues in a rural setting, it is recommended that programs of an educational nature be developed and promoted that would capitalize on the resources at Prairie Creek. The park seems an ideal place to host such programs in conjunction with education personnel from the community, schools or university. Water quality, animal and plant habitats, and recreation seem natural subjects for programs and workshops that could target age groups from the very young to the elderly. Partnerships between the park and community institutions will be key in developing this objective. In addition, it would be useful for the Parks Department to employ an educator that would be available to develop and deliver programming and provide outreach to community groups, potentially providing additional revenue to the Park.

As elements of this Master Plan are implemented, increased opportunities to discuss compatible development will arise. At a minimum, as environmental measures are developed, interpretative/ educational signage could be used at locations such as the buffer strips, the wetlands, erosion control sites, and revegetation areas. By using the Prairie Creek Reservoir as a focus for environmental issues, the area can serve as an example to the larger east-central Indiana region for how to involve the local community when working toward resource protection.

Objective 4: Encourage the development of educational programs and workshops that would take place at Prairie Creek Park.

Prairie Creek Reservoir offers a unique setting in Delaware County to provide a variety of educational programs and workshops on many different topics. By conducting workshops and educational programs on a variety of topics at the reservoir, non-traditional visitors will be able to utilize the Prairie Creek Park and reservoir area. Therefore, it is recommended that the Parks Department encourage and work in conjunction with local and regional community agencies, institutions, and organizations to develop educational programs and workshops that would take place at Prairie Creek Park. In addition, this plan recommends that the Parks Department work towards developing an educational program that would utilize the Prairie Creek Reservoir and Park area. Existing structures could be utilized for this purpose. Shelters are available for programs held in moderate temperatures, while the Lodge can provide space for workshops, classes, and programs in any weather.

Objective 5: Promote the use of Prairie Creek Reservoir as an outdoor laboratory for educational purposes.

Delaware County school districts do not currently own or lease land to utilize as an outdoor laboratory facility. However, members of the Prairie Creek steering committee believe it is in the community's best interest to educate young people about the nature of water quality, ecosystems, and other natural resources and means to sustain them while enjoying the activities that natural resources can afford. The reservoir and surrounding area is a venue for natural resources education that is unique to our area. It is recommended that the Delaware County schools partner with the Parks Department to make more use of the reservoir as an outdoor laboratory. These partnerships could lead to curriculum development funded through local foundations.

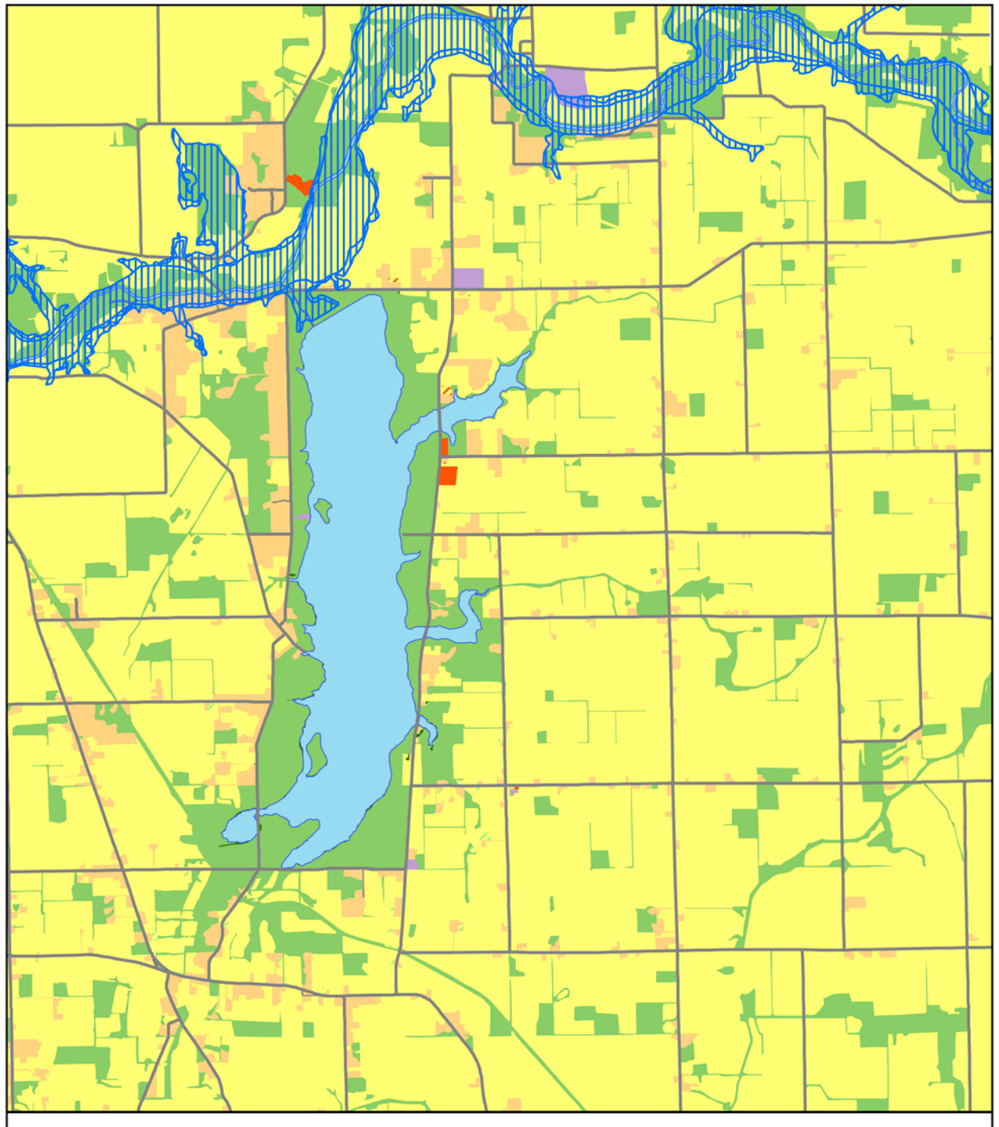

Figure 36: Existing Land Use. Source: Delaware County Cama Information & 2003 Aerial of Delaware County.

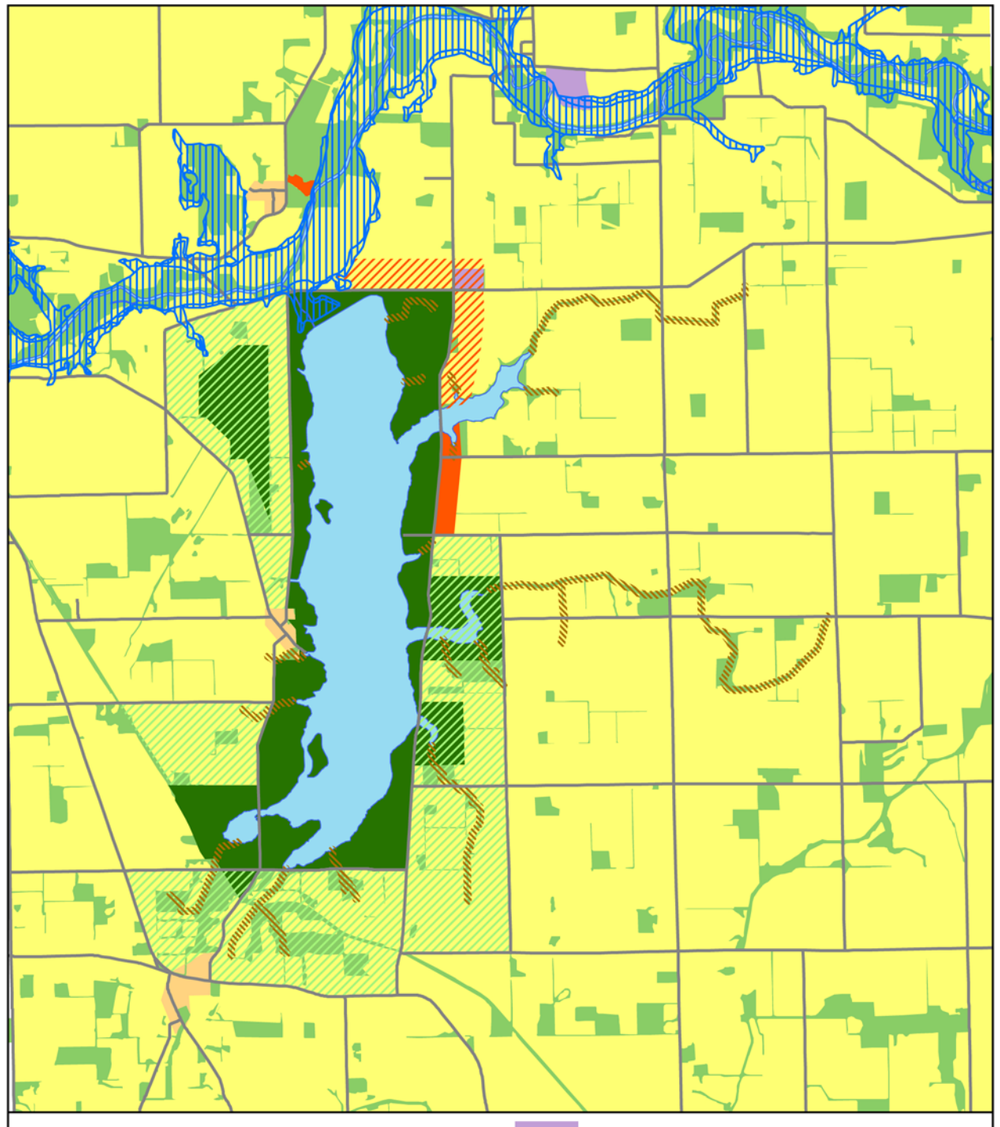

Figure 37: Prairie Creek Master Plan Land Use.