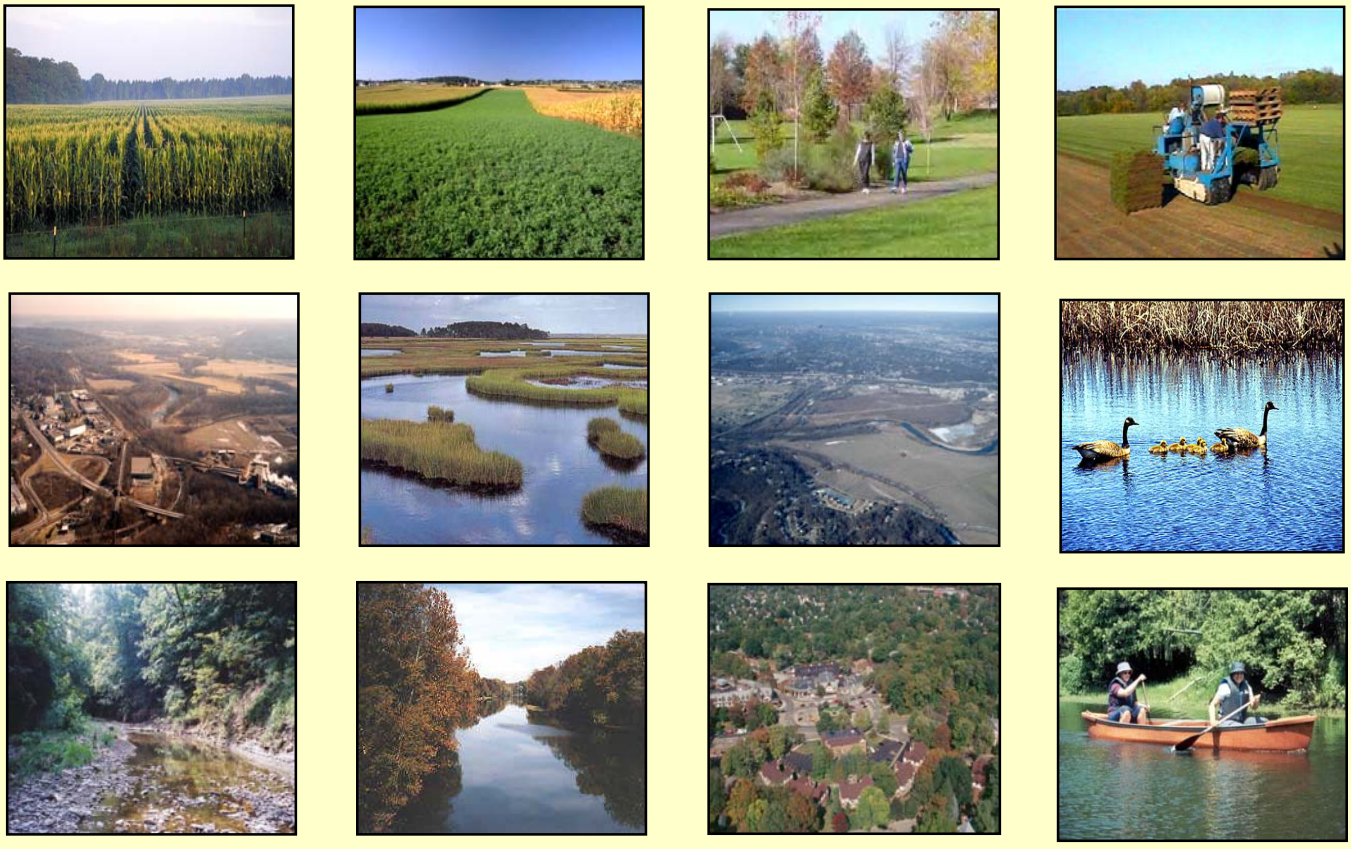
The Eastern Corridor

GREEN INFRASTRUCTURE PLANNING COMMITTEE

GREEN INFRASTRUCTURE CONCEPT MASTER PLAN

FINAL REPORT



MEISNER + ASSOCIATES LAND VISION

PLANNING
URBAN DESIGN
LAND PLANNING
LANDSCAPE ARCHITECTURE

2043 Madison Road
Cincinnati
Ohio 45208
(513) 321-2796
Fax (513) 321-3605

BALKE AMERICAN

GRAY & PAPE INC.
CULTURAL RESOURCES CONSULTANTS

FEBRUARY, 2005

Eastern Corridor

Green Infrastructure Planning Committee

Green Infrastructure Concept Master Plan

Final Report

February, 2005

Acknowledgements

The following individuals have participated in the Green Infrastructure Planning Committee:

Committee Members

Mark Policinski, Ohio-Kentucky-Indiana Regional Council of Governments (Chair)
Marty Bartlett, Eastern Corridor MIS Committee, ECLUVP Committee
Paul Braasch. Clermont County Office of Environmental Quality
Henry Dolive, Anderson Township
Doug Evans, Village of Newtown
Robert T. Fischer, Turpin Farms
Jim Garges, Cincinnati Recreation Commission
Don Keyes, Mariemont Preservation Foundation
Mike Lemon, Columbia Township
Edmund Motz, Motz Farms
Susan Olson, ECLUVP Wooster Focus Group
Margie Rauh, Past Chair Hillside Trust
K.D. Rex, Hamilton County Regional Planning Commission
Keith Smith, ODOT – District 8
Jack Sutton, Director, Hamilton County Park District

Other Participants

Turp Fischer, Turpin Farms
Allen Freeman, OKI
Margaret Gruss, Bicentennial Park
Jenny Kaminer, Village of Fairfax
David Motz, Motz Farms
Dan Motz, Motz Farms
Dean Niemeyer, Hamilton County Regional Planning Commission
Tim Reynolds, SORTA/*Metro*
Jeff Wright, City of Milford

Project Staff and Consultants

Steve Wharton, Balke American
Deb Osborne, Balke American
Kevin Pape, Gray & Pape
Gary Meisner, Meisner & Associates/Land Vision
Brian Griffith, Meisner & Associates/Land Vision
Frederick Lutt, Meisner & Associates/Land Vision
Adam Johnston, Meisner & Associates/Land Vision

Green Infrastructure Concept Master Plan

Eastern Corridor Green Infrastructure Planning Committee
Green Infrastructure Concept Master Plan

Executive Summary

Overview

The Green Infrastructure Concept Master Plan for the Little Miami River Plains is a continuation of the land use planning process established with the Eastern Corridor Land Use Vision Plan (LUVP) 2002, the Ohio-Kentucky-Indiana Regional Council of Governments (OKI) Eastern Corridor Major Investment Study (MIS) 2000, and the Eastern Corridor Multi-Modal Transportation Projects PE/EIS work that is currently underway. The Green Infrastructure Concept Master Plan and recommendations have two key applications: first, to be used by local communities in guiding future land use planning and public and private infrastructure and community development initiatives, and secondly, to create the context for the refinement of alternatives, design and development of transportation investment in the Eastern Corridor.

Committee's Work

The Committee was established by Resolution of the Hamilton County Transportation Improvement District (TID) to develop a consensus Green Infrastructure Concept Master Plan for the Little Miami River Plains Focus Area of the Eastern Corridor to coordinate land use, green infrastructure and transportation planning elements (see Chapter 6 for TID resolution). The Green Infrastructure Concept Master Plan will integrate long standing greenspace plans, preliminary mitigation and protection measures with local land use, watershed, new greenspace ideas, floodplain, aquifer, and other environmental stewardship programs for the preservation and improvement of wildlife habitat, water quality, together with important neighborhood community resources in the Little Miami River plains area. The Committee has focused on three areas of concern: economic development and community needs; environmental protection and preservation; and transportation improvements.

Summary of Findings

The Committee initially identified 34 key issues related to resource protection which were grouped into 14 natural and cultural resource protection priorities: agriculture, aquifer, communities and neighborhoods, cultural resources, streams and rivers, hillsides, wetlands, floodplains and hydrology, parklands, wildlife, mineral resources, land suited for commercial development, scenery and landscape, and geology.

Values associated with each of the resource protection priorities were then identified by the Committee, and subsequently organized into eight value groups (values overlapped between some resources). These value groups, with a summary of recommended protection measures for the Little Miami River plains area, are presented below (see Chapter 4 for further details):

- **Agriculture:** minimize loss of agricultural land; protect agricultural infrastructure; use natural landscapes; control invasive species; and preserve historic values.

- **Communities and Neighborhoods:** preserve and foster smart growth and sustainable development in nearby communities and neighborhoods; create a network of pedestrian and bike trails to connect to recreation, commercial and business districts; preserve historic areas and greenspace near neighborhoods to enhance community identity; and buffer new roadways and commercial development.

- **Geology:** protect and preserve the regionally significant geologic features of hillsides and Little Miami River floodplains/aquifers within greenspace; and restore disturbed formations (e.g., from mining and brownfields) with greenspace.

- **Historic and Cultural Resources:** identify, preserve and interpret important archaeological and historic sites to enhance the educational value of these cultural resources and link the sites with carefully located access routes.

- **Parklands, Greenspace and Recreation:** increase greenspace by restoring wetlands, preserving wooded hillsides, and creating a network of hiking and biking trails to link neighborhoods to greenspace to increase the use and pedestrian accessibility to those areas; create new Little Miami River access and new recreational opportunities such as hunting, fishing, and/or outdoor education

- **Scenery and Landscape:** create buffers around new commercial and industrial developments to screen objectionable views into those areas; conserve viewshed from existing and new roads and key vistas; and improve views from the Little Miami River with streamside buffers and reforestation.

- **Water Quality:** manage stormwater runoff; develop watershed plans and pollution prevention practices; restore riparian corridors and create wetlands to improve water quality; and protect aquifer recharge areas.

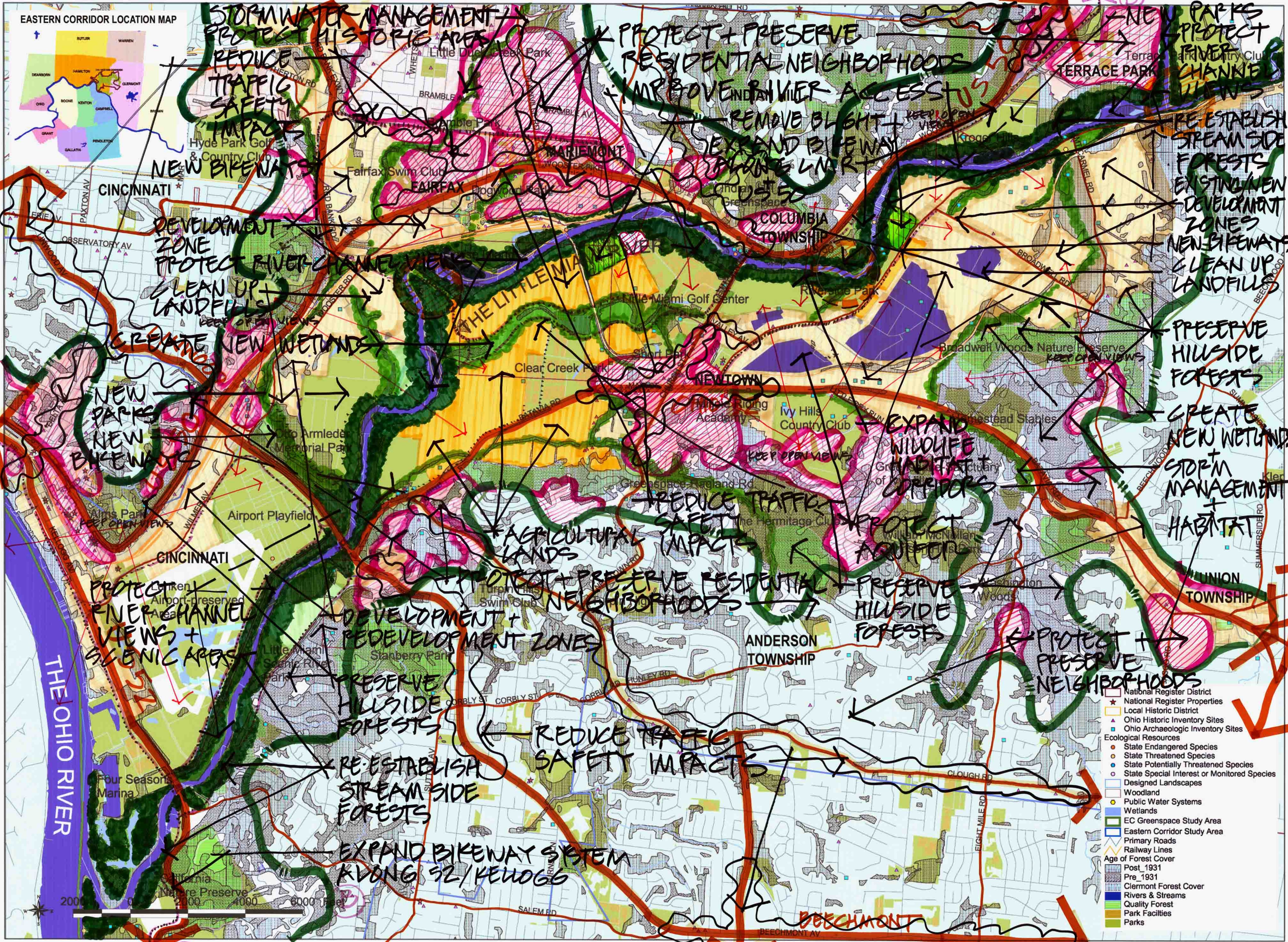
- **Wildlife, Fish and Habitat:** restore and preserve existing habitat; control invasive species; create new greenspace; provide wildlife crossings; and create links between greenspace to create wildlife corridors and provide wildlife connections.

Conclusion

This report and the Green Infrastructure Concept Master Plan will serve as a guide document to keep protection and enhancement of the Little Miami River plains in the forefront of future work on the Eastern Corridor study and the planning efforts of local jurisdictions. Key next steps are described in Chapter 5.

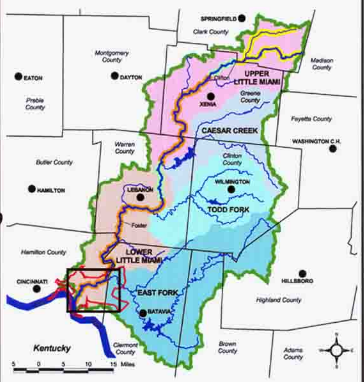
GREEN INFRASTRUCTURE PLAN

The Eastern Corridor

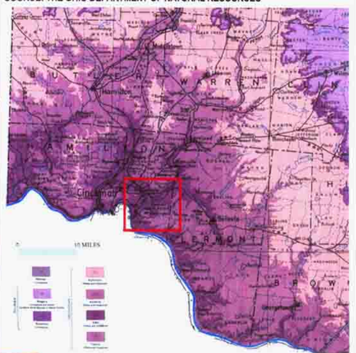

EASTERN CORRIDOR LOCATION MAP
STORMWATER MANAGEMENT
PROTECT HISTORIC AREAS
REDUCE TRAFFIC SAFETY IMPACTS
NEW BIKEWAYS
PROTECT + PRESERVE RESIDENTIAL NEIGHBORHOODS
+ IMPROVE RIVER ACCESS
REMOVE BLIGHT +
EXPAND BIKEWAY ALONG LM RT
NEW PARKS
PROTECT RIVER CHANNEL VIEWS
RE-ESTABLISH STREAM SIDE FORESTS
EXISTING/NEW DEVELOPMENT ZONES
NEW BIKEWAYS
CLEAN UP LANDFILLS
DEVELOPMENT ZONE
PROTECT RIVER CHANNEL VIEWS
CLEAN UP LANDFILLS
CREATE NEW WETLANDS
NEW PARKS
NEW BIKEWAYS
PRESERVE HILLSIDE FORESTS
CREATE NEW WETLANDS + STORM MANAGEMENT + HABITAT
EXPAND WILDLIFE HABITAT CORRIDORS
REDUCE TRAFFIC SAFETY IMPACTS
PROTECT AQUIFER
AGRICULTURAL LANDS
PROTECT + PRESERVE RESIDENTIAL NEIGHBORHOODS
PRESERVE HILLSIDE FORESTS
PROTECT RIVER CHANNEL VIEWS + SCENIC AREAS
DEVELOPMENT + REDEVELOPMENT ZONES
PROTECT + PRESERVE NEIGHBORHOODS
PRESERVE HILLSIDE FORESTS
REDUCE TRAFFIC SAFETY IMPACTS
RE-ESTABLISH STREAM SIDE FORESTS
EXPAND BIKEWAY SYSTEM ALONG 32/KELLOGG
KEEP OPEN VIEWS
BEECHMONT
CINCINNATI
FAIRFAX
MARIEMONT
TERRACE PARK
COLUMBIA TOWNSHIP
NEWTOWN
ANDERSON TOWNSHIP
UNION TOWNSHIP
THE LITTLE MIAMI RIVER
THE OHIO RIVER
Little Miami Golf Center
Clear Creek Park
Ivy Hills Country Club
Broadwell Woods Nature Preserve
Airport Playfield
Alms Park
Four Seasons Marina
Hyde Park Golf & Country Club
Fairfax Swim Club
Otto Armleder Memorial Park
National Register District
National Register Properties
Local Historic District
Ohio Historic Inventory Sites
Ohio Archaeologic Inventory Sites
Ecological Resources
State Endangered Species
State Threatened Species
State Potentially Threatened Species
State Special Interest or Monitored Species
Designed Landscapes
Woodland
Public Water Systems
Wetlands
EC Greenspace Study Area
Eastern Corridor Study Area
Primary Roads
Railway Lines
Age of Forest Cover
Post_1931
Pre_1931
Clermont Forest Cover
Rivers & Streams
Quality Forest
Park Facilities
Parks

CONCEPT MASTER PLAN

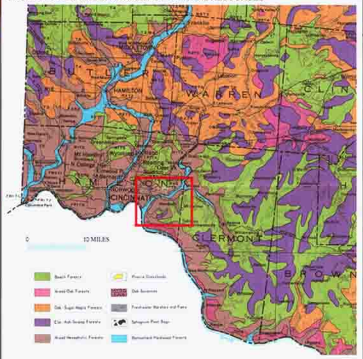
THE LITTLE MIAMI RIVER WATERSHED
SOURCE: CAGIS & THE DEPARTMENT OF AGRICULTURE NATURAL RESOURCES



GEOLOGIC MAP OF OHIO
SOURCE: THE OHIO DEPARTMENT OF NATURAL RESOURCES



NATURAL VEGETATION MAP
SOURCE: THE OHIO DEPARTMENT OF NATURAL RESOURCES



PLANNING
URBAN DESIGN
LAND PLANNING
LANDSCAPE ARCHITECTURE

MEISNER ASSOCIATES
LAND VISION

BALKE AMERICAN

GRAY & PAPE

Chapter 1 Introduction

1.1 Definition of Green Infrastructure

Infrastructure is defined as - "the substructure or underlying foundation, especially the basic installations and facilities on which the continuance and growth of a community or state depends". Many infrastructure systems support our cities and suburbs. Physical infrastructure systems such as roads, water, electricity, telephone, Internet, stormwater, and sanitary sewer are vital to sustaining our urban systems. Social infrastructure systems as such as hospitals, libraries and schools are also vital to maintaining our quality of life. These systems are often referred to as gray or built Infrastructure systems.

Infrastructure systems change over time to meet new and changing public demands. Since the early 1970's there has been growing awareness that the natural systems of our environment are important to our well-being. In the last decade it has become apparent that traditional infrastructure systems do not effectively address environmental problems such as open space, stormwater management, and wildlife habitat. Early city planners including Nolen, Kessler, and Olmsted advanced these openspace planning principles.

It is increasingly clear that communities in the Eastern Corridor recognize the importance of green infrastructure - a strategically planned and managed network of natural areas, conservation lands, and working lands with conservation value that supports native species, maintains natural ecological processes, sustains air and water resources, and contributes to the health and quality of life for communities and people.

The green infrastructure network encompasses a wide range of landscape elements including: *natural areas* - such as wetlands, woodlands, waterways, floodplains, hillsides and wildlife habitat; public and private *conservation lands* - such as nature preserves, open space, greenways, and parks; and public and private *working lands* of conservation value - such as forests, farms, and nurseries, as well as public and private utility areas such as storm water management facilities.

Green Infrastructure is a system of large greenspace, called 'hubs,' small spaces called "sites," and the trails and linear greenspace that join all of the hubs and sites together, called 'links" that when carefully planned encompass the range of landscape elements.

Green infrastructure planning helps frame the most efficient location for development and growth - and related gray infrastructure - ensuring that agencies, developers, citizens, and communities capture the cost advantages of location and create and protect neighborhood and community natural assets and amenities.

Green Infrastructure has been defined in other, broader terms as well. One definition reads: “Our nation’s natural life support system – an interconnected network of protected land and water that supports native species, maintains natural ecological processes, sustains air and water resources and contributes to the health and quality of life for America’s communities and people” (President’s Council on Sustainable Development). Another definition reads: “An interconnected network of green spaces that conserves natural ecosystems values and functions and provides associated benefits to human populations” (Benedict).

1.2 History of Green Infrastructure

The concept of Green Infrastructure is based on two earlier ideas: linking parks together for the benefit of people, and linking greenspaces together to for the benefit of wildlife.

Frederick Law Olmsted, one of the founders of modern landscape architecture in the United States, was an early proponent of linking parks. He stated, “No single park, no matter how large and how well designed, would provide citizens with the beneficial influences of nature” and that parks needed “to be linked to one another and to surrounding residential neighborhoods” (Little). In 1907, city planner and landscape architect George Kessler proposed an extensive system of parks linked to one another with parkways for the City of Cincinnati. Kessler proposed a large formal park along the Ohio River at the junction of the Little Miami River, a site that today is in part occupied by a former sanitary landfill, Lunken Airport, several sports fields, and numerous businesses and industry. He also planned a system of parkways and green corridors throughout the Greater Cincinnati area. Columbia Parkway is built from Kessler’s visionary plan (Culberton, 15-16).

Wildlife conservationists and ecologists recognized the need to link parks for the needs of wildlife. Studies showed that many types of wildlife would not survive in small parks that were physically isolated. Parks linked to one another permit wildlife to move between areas and it increase species diversity.

1.3 Principles for Green Infrastructure Planning, Design and Implementation

Principle 1: Identify and protect green infrastructure before development. Green infrastructure needs to be identified and protected in advance of land development due to the high cost of restoration and the difficulty of creating human-made systems that function as well as natural systems. Identifying where green infrastructure is needed and desired will aid in public and private protection of critical resources.

Principle 2: Engage diverse people and organizations in your green infrastructure initiative, obtaining input from representatives of different professions and sectors. To be successful, Green

Infrastructure initiatives must excite and engage many people. Just like built infrastructure systems are planned and implemented through an open participation process, Green Infrastructure systems must be planned and implemented involving public input and incorporating the comments and issues of citizens, community organizations, and private landowners.

Principle 3: Recognize that linkage is key, for connecting natural areas and features and for connecting people and programs. The desired outcome for all Green Infrastructure initiatives is the creation of a network of green spaces that maintains vital ecological processes, wildlife populations, and human health. Just like the nation's interstate, state, local and private roads are designed holistically to create a functional transportation system, we need to design Green Infrastructure holistically, creating physically connected green space systems through the protection and restoration of vital ecological areas and linkages.

Principle 4: Design green infrastructure systems that function at different scales, across political boundaries, and through diverse landscapes. Our nation's transportation, power, communication and other gray infrastructure systems are designed to connect across multiple jurisdictions and incorporate facilities that function at different scales. Likewise, we need to design Green Infrastructure systems strategically to connect across urban, suburban, rural and wilderness landscapes and incorporate green space elements and functions at the state, regional, community and parcel scales.

Principle 5: Ground green infrastructure activities in sound science and land-use planning theories and practices. Just as our transportation, water, electric and telecommunication systems are grounded in the theories and practices of diverse professional disciplines (for example, traffic engineering), we need to design and plan Green Infrastructure systems according to the theories and practices of scientific and land planning professions such as conservation biology, landscape ecology, urban and regional planning, landscape architecture and geography.

Principle 6: Fund green infrastructure up-front as a primary public investment, using the full range of Available financing options. Our nation's gray infrastructure - our transportation, water, electric, telecommunication and other essential community support systems - are financed as primary budgetary line items. State and local governments use dedicated gas taxes and other public funding mechanisms to pay for the planning, rights-of-way acquisition, construction, maintenance and improvement of our highway systems. Likewise, we need to finance Green Infrastructure planning, protection, management and/or restoration as a priority public investment.

Principle 7: Emphasize that green infrastructure benefits are afforded to all, to nature and to people. Green Infrastructure provides a diversity of public and private functions and values that address both natural and human needs and benefit the environment and communities. These benefits need to be documented, both in terms of their ecological values for people and the environment and their economic values to society.

Principle 8: Make green infrastructure the framework for conservation and development.

The gray infrastructure upon which our communities depend - which provides the framework for future growth and development - is planned in advance as a system of interconnected parts. We need to embrace Green Infrastructure as the framework for conservation.

1.4 Green Infrastructure Today

Green Infrastructure is more than the linking of parks and greenspaces for wildlife and aesthetics. Green Infrastructure today can potentially integrate local land use, watershed, greenspace, floodplain, aquifer, and other environmental planning/stewardship programs for the preservation and improvement of wildlife habitat, water quality, and other community resources. These resource elements when integrated with potential mitigation concepts can maximize the community development efforts with greenspace conservation and preservation goals.

> *"Our fledgling new century is calling out for a new vision - as bold and daring as parks were in the time of Teddy Roosevelt. A vision based not on the notion that parks are "set aside" or "protected from," but that they are part of the larger landscape. It's time to liberate parks from their borders - and to free our thinking from restrictive confines as well. It's time for a conservation vision that is defined not by boundaries, but by the integrity of the land.*
>
> *In our new concept, there are gradations from pristine lands to those that support varying and appropriate densities of human populations engaged in a variety and varying intensities of land uses - activities that are complementary and in harmony with natural processes and undertaken compatibly with parks and protected areas. "*
>
> -- Steven J. McCormick, President & CEO
> Nature Conservancy, Winter 2003

1.5 Green Infrastructure Plan and the Little Miami River Scenic River

The Little Miami River is designated as a component of the Ohio Scenic River System and a state-administered component of the National Wild and Scenic Rivers System. Portions of the Little Miami River and its immediate environment possess significant natural values and public outdoor recreation potential and are worthy of preservation in a free-flowing condition. Scenic, recreational, fish and wildlife, geologic and historic values are such that segments of the Little Miami River met the criteria for classification as "scenic" or "recreational" in the state and national scenic river systems. These values are now referred to as outstandingly remarkable values (ORVs) by the National Park Service. Because of its varied character, the Little Miami River does not conform to a single classification. The steeply wooded hillsides near Fort Ancient differ sharply from the cultivated bottomland near Corwin and the highly urbanized lower portion of the river valley. The river classification is an indication of the degree of development at the time of designation, and how the river segment will be administered. The purpose of the classification is to provide a threshold of criteria for protection of those values that existed at the time of designation.

The segment of the Little Miami River from Loveland upstream to its sources was officially designated in the Ohio Scenic River System as a state scenic river area in April 1969. The lower segment of the Little Miami River from the East Fork to the Ohio River was officially designated a component of the Ohio Scenic River System in October 1971.

In 1973, the segment of the Little Miami River, from Glen Island, just below Fostoria, Ohio, upstream 64 miles to the State Highway 72 crossing at Clifton, Ohio was designated a state-administered scenic river area component of the National Wild and Scenic Rivers System by the Secretary of the Interior under the provisions of Section 2(a) (ii) of the Wild and Scenic Rivers Act. The lower segment of the Little Miami River was designated in December, 1979 as a state-administered recreational river area component of the National Wild and Scenic Rivers System by the Secretary of the Interior under the provisions of Section 2(a) (ii) of the National Wild and Scenic Rivers Act. The National Park Service (NPS) and Ohio Department of Natural Resources (ODNR) define 'Recreation River Areas' as "those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past."

The Scenic Rivers program within the Division of Natural Areas and Preserves is the lead agency within the Ohio Department of Natural Resources in matters dealing with the state-administered management of the Little Miami Scenic River under Section 2(a)(ii) of the National Wild and Scenic Rivers Act. ODNR's Little Miami State Scenic River Management Plan (June 1985) identifies objectives, tasks and implementation activities for conservation and preservation of the values for which the river was designated. The ODNR Little Miami Scenic River Assistance Manual (1980) outlines goals, provides recommended standards, and serves as a means of coordinating efforts to protect the river.

A key component of the Ohio Scenic Rivers Program is to coordinate uses of the river and adjacent banks to protect the rights of private property owners while insuring maintenance of the highest environmental qualities for the benefits of all citizens and to encourage the involvement of all government agencies having jurisdiction, both state and local, in the development and implementation of the Little Miami River Assistance Program. Components of the Green Infrastructure Concept Master Plan, outlined in this report, support a number of ODNR Scenic Rivers Program goals and objectives and include strategies for preservation of sensitive areas, opportunities to expand recreation and rehabilitation, including riparian preservation, bank stabilization and reforestation activities, and increased coordination with local projects and public involvement. Further development of the Green Infrastructure Concept Master Plan and refinement of the resource protection measures identified should be coordinated with ODNR Ohio Scenic River Program and other local and state agencies, as applicable.

1.6 Eastern Corridor Land Use Vision Plan

The Eastern Corridor Land Use Vision Plan (LUVP) process was initiated in 2000 and completed in 2002. The plan has been adopted by Hamilton and Clermont Counties and incorporated into their respective comprehensive plans. In the two year planning process a diverse group of citizen planners assembled a broad vision for the 75+ square mile Eastern Corridor planning study area:

> *"Forested waterways, greenways, and tree-covered hillsides define the character of the region, making it attractive to visitors as well as residents. Jurisdictions work cooperatively to focus development in the most appropriate areas while environmentally sensitive zones, parks, and recreational areas are preserved. Pedestrian-friendly neighborhoods with housing opportunities and accessibility for all are distributed throughout the region. A well integrated transportation system composed of roads, convenient transit options, and hike/bike trails allow local residents and passers-through to get to employment, shopping, recreation, entertainment, and other destinations quickly and efficiently with minimal adverse impacts to the environment or local communities."*

This Vision Statement and recommendations of the LUVP and River Plains Focus Area, along with existing park plans, open space plans, and river and hillside conservation initiatives provided a starting point for the work of the Green Infrastructure Planning Committee (GIPC).

The contents and recommendations of the Eastern Corridor Land Use Vision Plan were reached through a collaborative process by a diverse group of citizen planners, inviting participation from all local jurisdictions and neighborhoods, as well as interested stakeholders. This participation took the form of eight (8) Vision Group meetings, four (4) Focus Area Group meetings for each of the six (6) Focus Areas, and two (2) public open houses. All meetings were open to the public. Additionally, meetings were held with participants and jurisdictional representatives who were unable to attend scheduled meetings to update them, and get their input.

The Eastern Corridor Land Use Vision Plan study area was divided into five geographic "focus areas", and because the Little Miami River is a major resource in the area, a sixth overlying focus area was added encompassing the river plains of the Little Miami River. These study boundaries were "soft" boundaries, in that relevant information and impacts from areas outside those boundaries were also considered. Stakeholder representatives from throughout the area participated in generating ideas for creating a desirable future for the corridor region focus areas, including the River Plains Focus Area. The findings of this planning effort were confirmed through the conducting of a Public Opinion Land Use Survey for the region, during early 2002.

The River Plains Focus Area highest priority Action Items are:

- Preserve land in river plains for agriculture or open space.
- Reestablish forested streamside corridors along the Little Miami River to preserve and enhance water quality.

- Reduce flood hazards and moderate urban storm runoff (Fairfax, Newtown, Linwood, etc.).
- Preserve existing parks and open space, and create new parks and public open space for under-served areas (e.g., better recreational access to Little Miami and Ohio Rivers, etc.)
- Create connectivity improvements.
- Create bike trail connections (e.g., connections from neighborhoods to Little Miami, Lunken, and Ohio River Bike Trails)
- Create areas with multiple pedestrian-friendly destinations within walking distance. These would be areas that could effectively be served by modes of transportation other than only automobiles, or could serve to reduce the amount of automobile travel necessary to accomplish multiple purposes.
- Reduce congestion, create traffic claming measures, and enhance pedestrian-friendly character

As stated in the Mission Statement the land use vision planning process sought to create a unified land use vision that will guide environmentally and economically sustainable development in the Eastern Corridor of the Greater Cincinnati Metropolitan Area. It sought also to encourage the equitable distribution of the benefits and impacts of public and private improvements made in this area in the future.

The participants felt that accelerating rate of change in both society and technology makes it less important to create a “fixed” land use map for some point in the distant future than to identify how people would like to live and interact with their surroundings. The participants determined it more important to collaboratively create the process that manages change and to agree on key criteria to use to evaluate choices in the future.

1.7 Context Sensitive Design Planning Process

Context sensitive design is a collaborative, interdisciplinary approach to transportation investment planning, design and construction. This approach involves all partners, stakeholders and the public to ensure that transportation projects are in harmony with communities and that they preserve environmental, scenic, aesthetic, historic resources, and community values. The effective application of context sensitive design techniques can achieve these goals while maintaining safety and mobility. This collaborative effort continues through the project development process to ensure that issues identified are addressed. By taking a proactive approach, the Eastern Corridor is an example of environmental stewardship.

The Federal Highway Administration (FHWA) designates Environmental Stewardship and Streamlining as one of the agency’s Vital Few Goals (VFG), and has specified Ecosystem and Habitat Conservation as the key objective for demonstrating environmental stewardship because:

- It focuses on specific contributions of federally-funded projects to ecosystem conservation;

- It is a particularly high and growing priority for environmental review and regulatory agencies, environmental interest groups, and the public;
- It provides highly visible examples of proactive environmental stewardship by transportation agencies;
- It presents opportunities for the use of cutting edge science and technology; and
- It allows agencies to mitigate project impacts with flexible, regional, ecosystem approaches, rather than site-specific mitigation plans that are often more costly and provide less ecological benefit.

The Eastern Corridor project has incorporated FHWA environmental stewardship objectives, and has been an example of a project that demonstrates this FHWA VFG throughout the project planning process, from the MIS recommendation for development of a Land Use Vision Plan, and into the Part A work program through consideration and support of land use in alternatives development. The Green Infrastructure planning process is a continuation of this demonstration of environmental stewardship, as ecosystem and habitat protection recommendations developed by the Green Infrastructure Committee are carried through into Part B for further development and implementation.

1.8 Purpose of the Green Infrastructure Planning Committee

The purpose of the Green Infrastructure Planning Committee's work was to develop a consensus Green Infrastructure Concept Master Plan building upon the recommendations for the River Plains Focus Area of the Eastern Corridor LUVP and to establish a proactive environmental stewardship approach to natural resource conservation and environmental mitigation for the Eastern Corridor. Work conducted for the Green Infrastructure Concept Master Plan will create the context for alignment refinement, preferred alternative selection, and mitigation planning in transportation investment Part B (Tier 2) of PE/EIS work, and will also be used by local communities in guiding future land use planning and community development. The Committee focused on three areas of concern:

- Economic development and community needs
- Environmental protection and preservation
- Transportation improvements

The Green Infrastructure Concept Master Plan is a continuation of many earlier greenspace and city planning efforts. It follows several planning efforts conducted for the Eastern Corridor Multi-modal Projects, including: the Eastern Corridor Land Use Vision Plan (LUVP), the OKI Eastern Corridor Major Investment Study (MIS) and Part A of the Eastern Corridor Multi-Modal Transportation Projects, as identified in the Tier 1 Draft Environmental Impact Statement (DEIS).

1.9 Green Infrastructure Planning Process

The Committee determined to keep larger planning issues in the forefront when working on complex land uses and transportation planning projects. Some of the key considerations are land use, transportation planning, and context sensitive design development, including:

- Health, safety, and welfare of communities and neighborhoods.
- Multi-modal connectivity to recreation, residential, and business locations.
- Quality-of-life in communities and neighborhoods.
- Opportunities for growth and economic development within local jurisdictions.
- Importance of greenspace conservation and park / recreational facility expansion to serve the public needs.
- Need to balance growth and resource conservation.
- Physical characteristics of the proposed transportation investment area including alignment, width, design, access locations, transit hubs, stormwater and other impacts, grading, and landscaping.
- Cost of right-of-way acquisition, road, rail, bus, and other transportation related investments.
- Environmental quality including air, water, and soil quality; protection and restoration of wetlands, riparian habitat, and aquifers; reduction in stormwater runoff; and control of traffic and other sources of noise.
- Historic & Scenic Characteristics including preservation of historic sites and buildings, and preservation and enhancement of natural scenic features.

The Green Infrastructure planning process consisted of these tasks:

- Refine and summarize inventory and analyze current information and any additional work to date.
- Develop a complete list of key resources and combine those into a focused list of resources.
- Incorporate agency and stakeholder coordination through public meetings and stakeholder interviews.
- Prepare a Green Infrastructure Concept Master Plan based on agency and stakeholder input.
- Provide recommendations to TID Board of Trustees, implementation partners, local jurisdictions and key stakeholders.

Public participation and input has been important in all stages of this planning effort and related transportation planning for the Eastern Corridor. The media was notified of all meetings and meetings were open to the public. The public meetings with the GIPC members, as listed below, provided the stakeholders and public agencies opportunities for their input:

1) **Meeting #1 September 16, 2004 Kick-off and Update:** Project staff presented previous planning studies to GIPC members together with an informational overview of transportation planning work. Goal setting work was conducted as well.

2) **Meeting #2 October 5, 2004 Local Plans and Goals Meeting:** GIPC members shared local plans and funding goals for their respective townships, municipalities, counties, agencies, and properties. Additional goal setting and resource identification work was conducted.

3) **Meeting #3 October 26, 2004 Greenspace Workshop with Additional Analysis:** EC Team Members provided an overview of environmental regulations to be considered and the key components of a Green Infrastructure Plan. GIPC members developed a revised list of resources and then ranked them as a group and individually.

4) **Meeting #4 November 16, 2004 Greenspace Workshop Continued:** GIPC members refined valued resources and discussed potential protection measures and design strategies.

5) **Meeting #5 December 7, 2004 Green Infrastructure Concept Master Plan:** Committee members reviewed the Green Infrastructure Concept Plan and further discussed resource preservation issues and strategies to protect.

6) **Green Infrastructure Concept Master Plan/Refinement:** Project staff refined the Green Infrastructure Concepts and identified potential hubs, links, and sites, protection measures, and design strategies. Potential funding strategies for land acquisition and restoration were developed.

7) **Meeting #6 February 22, 2005 Green Infrastructure Concept Master Plan Final Report – *Draft***: Project staff presented and discussed the draft final report and recommended next steps.

8) **Committee Recommendations:** Final draft Green Infrastructure Concept Master Plan including next step recommendations will be presented to the TID and local jurisdictions.

Chapter 2 Inventory of Natural and Cultural Features

A variety of natural and cultural features have been inventoried and mapped in the course of the Eastern Corridor MIS, Eastern Corridor LUVP, and the Eastern Corridor Multi-Modal Transportation Projects PE/EIS Part A (Tier 1) work including: wetlands and soils; land cover; topographic elevations and slope; soil limitations; geologic and natural features; streams and aquifers; and archaeological and historic resources.

2.1 Wetlands and Soils Inventory

Natural wetlands are located along the Little Miami River floodplain, the lower reaches of the Little Duck Creek, Clear Creek, and other tributaries. Other wetlands, generally formed in disturbed areas (such as mines and landfills) are located east of Newtown. No extensive areas of mapped hydric soils (i.e., wet soils that indicate possible wetlands) occur in the area. Hydric inclusions soils (i.e., soils that have some wet components) occur in the floodplains and non-hydric soils occur in the hillsides.

2.2 Land Cover

Urban land cover is located in the flat areas above the perimeter of the Little Miami River floodplain with the exception of Newtown, which is primarily located within the 100-year floodplain. Agriculture land cover is located in the floodplains of the Little Miami River, Little Duck Creek, and the Ohio River. Wooded land cover is located primarily in the hillside and ravines adjacent to floodplains. Wetlands occupy a few small areas in the floodplains.

2.3 Topographic Elevations and Slope

Flat Slopes from 0 to 10% predominate in the floodplains of the Little Miami River, Little Duck Creek and the Ohio River. Flat slopes are suitable for most types of development. Moderate slopes of 10-15% occur at the foot and crest of the hillsides surrounding the valleys. Moderate slopes limit some type of development. Steep slopes of 15-40% occur at the middle elevations of the hillsides. Steep slopes are unsuitable for most types of development.

2.4 Soil Limitations

Soil Limitations are based on the suitability of soils for the construction of foundations, buildings, and roadways. Soils classified as having Severe Limitations are unsuitable for most types of development and they occupy the lowest elevations of the floodplain areas and the steep slopes adjacent to the ravines and floodplains. Soils classified as having Moderate Limitations are suitable for many types of development, with certain restrictions, and occupy the higher elevations of the Little Miami River floodplain east of Newtown. Soils classified as having Slight Limitations are suitable for most types of development and occupy the level areas adjacent to the bluffs overlooking the Little Miami River floodplain.

2.5 Geologic and Natural Features

Geology: The geology of the study area consists of limestone and shale bedrock from the Ordovician Era overlain by glacial drift, with alluvium along the floodplains. Except for steep-slopes, topography in the area is shaped by the deposition and erosion of these glacial deposits.

Glacial Activity: Glacial activity in the study area consists of outwash in the floodplains, ground moraines in the hillsides, and lake deposits in the flat plateaus of Fairfax and Mariemont.

Physiographic Regions: Two physiographic regions are present in the study area. The Interior Plateau Region is adjacent to the Ohio River and the Little Miami River, and the Eastern Corn Belt Plains is located in the area to the north.

Natural Vegetation: Bottomland Hardwood Forests were the original vegetation in the floodplains along the Ohio River and major tributaries. Mixed Mesophytic Forests occurred on the hillsides adjacent to the floodplains. Beech Forests occurred in the plateaus surrounding the Little Miami River valley. Urban and agricultural development has replaced much of these original communities.

2.6 Streams and Aquifers

The study area occurs in the Little Miami River and Ohio River drainage basins. Key features in the area are the Little Miami River, East Fork and other tributaries, including Duck Creek, Dry Run and McCullough Run. Most streams in the area have been disturbed by adjacent urban development, including rechannelization, bank modifications and/or streambank vegetation clearing. Designated 100-year floodplains occur along each of these streams, ranging from broad widths along the Little Miami River and Ohio rivers, to narrow corridors along the smaller tributaries.

Most of the study area is located within the boundaries of the Buried Valley Aquifer System, which is designated by USEPA as a Sole Source Aquifer. Many communities in the area use groundwater from this aquifer as either their sole or partial water supply. Wellhead Protection Areas occur in Indian Hill and Milford, and one OEPA registered Public Water Supply (Township Fields and Tavern) is located east of Newtown along Round Bottom Road.

2.7 Cultural Resources

Over twenty previously recorded archaeological sites occur along the Little Miami River floodplain in the project vicinity, although the extent of these sites and their significance has not been well documented. Two National Register archaeological districts occur in the area, including the Hahn Site, located north of SR 32 on the northwest side of Newtown, and the Perin Site, located in Newtown. Historic sites in the area that are listed on the National Register include the Mariemont Historic District, Odd Fellow's Cemetery Mound (in Newtown), and two individual historic buildings in Newtown (Joseph Martin House and William Edwards Farmhouse).

Chapter 3 Analysis of Resource Groups

The process of identifying resources in need of protection began with the identification of priorities and values by the Green Infrastructure Committee. A list of 34 preliminary priorities was produced by the planning partners and reduced to 14 Resource Groups after Committee discussion. Each Resource Group with its Committee priorities and associated characteristics and values to protect is described below.

3.1 Agriculture

Agriculture is a historical and economically significant land use within the study area. Several historic working farms are located in the floodplain of the Little Miami River. Committee priorities are: preservation, access, and expansion of agricultural land**.** Values associated with agriculture identified by the Committee include: historic agricultural use, air quality, seasonal noise reduction, aesthetic views of the Little Miami River bottomland and farm fields, economic value and jobs, and wildlife habitat.

3.2 Aquifer

A Class 1 aquifer lies beneath the Little Miami River. Protection of the aquifer is important to maintaining high quality and abundance groundwater from public and private wellheads. Committee priorities are: aquifer protection; ground water recharge; and restoration and expansion of aquifer recharge areas. Values associated with the aquifer include: groundwater quality and supply; protection of the Indian Hill OEPA Wellhead Protection Area; and protection of individual OEPA public water supply wells.

3.3 Communities and Neighborhoods

The communities and neighborhoods, such as Newtown, Mariemont, and Fairfax, are important resources in the study area. Protection of the communities from negative factors such as noise and air pollution needs to be balanced with the desire to increase pedestrian and vehicular access, safety, and to create a sense of identity. Committee priorities are: access protection and expansion; fire and safety services; utility system protection and expansion; noise impact protection; pedestrian access and safety; and vehicular access and safety. Values associated with communities and neighborhoods identified by the Committee are: fire safety; emergency response time; community cohesion and sense of identity; property values; displacement of people, business, and farms; reduction of traffic congestion to protect critical physical, social and economic links; and greenspace connectivity and pedestrian safety.

3.4 Cultural Resources

Cultural resources in the area include archeological sites from several groups of Native Americans, farmsteads of early European settlers, and historic towns and buildings. These cultural resources are valuable from an educational and place making perspective. Committee priorities are for the protection of archeological and historic resources. Values associated with cultural resources are: educational value;

creation of a sense of place; an appreciation of prehistoric use and occupation by earlier cultures; and the potential sacred value of sites to Native Americans.

3.5 Streams & Rivers

The Little Miami River - a state scenic river and state-administered recreational river area component of the national wild and scenic rivers system - and its tributaries are significant resources in the study area. The streams and rivers provide recreation, wildlife habitat, and are of scenic value. Committee priorities include: scenic river corridor view protection; scenic river channel view protection; stream edge protection; and stream forest restoration and expansion. Associated characteristics and values to protect include: recreation; aesthetic value of the Little Miami River; streambank protection to stabilize the streambank and reduce erosion; riparian corridor restoration to improve water quality; improvement of habitat for aquatic species to increase species diversity; and stream forest restoration to improve water quality and habitat.

3.6 Hillsides

The numerous tree covered hillsides give the study area a distinct look. The presence of Kope formations on many of the hillsides makes the areas unsuitable for development due to likelihood of landslides. Committee priorities include protection, restoration, and expansion of hillsides. Values associated with hillsides are: natural geologic value; reduction in erosion; aesthetic value; wildlife habitat; increased air quality from tree cover; and scenic buffer.

3.7 Wetlands

Wetlands in the study area are located along the Little Miami River and its tributaries. Wetlands provide flood control, improve water quality, reduce stormwater runoff, provide wildlife habitat, and are visually appealing. Committee priorities include protection, restoration, and expansion of wetlands. Values associated with wetlands are: stormwater management; flood control; wildlife and plant habitat; aesthetic value; and improvement of water quality.

3.8 Floodplains & Hydrology

Floodplains and hydrology of the study area are significant environmental features that affect the natural and cultural use of the land. Committee priorities are flood and stormwater runoff protection. Values associated with the floodplains and hydrology is: reduction in economic loss due to flooding; preserve flood related silt deposition on agricultural bottom lands; limited development potential which indirectly protects farmland located in the area; and wildlife habitat.

3.9 Parklands, Greenspace and Recreation

Parklands, greenspace and recreation located within the study area are focused on the Little Miami River and within communities and neighborhoods. Committee priorities are: preservation and expansion of parklands, bikeways, and walkways; provision of recreational opportunities; and preservation and

expansion of river resources. Values associated with parklands, greenspace and recreation are: aesthetic value; natural buffers; wildlife habitat; scenic vistas; wildlife observation; bike riding; canoeing; boating; fishing; photography; tourism; accessibility; and organized sports.

3.10 Wildlife Threatened / Endangered Species

Known occurrences of several state-threatened and endangered plant and animal species have been reported from the project study area. Most of these are known from the Little Miami River and adjacent riparian corridor, including several mussels, fish and plant species. Committee priorities are: protection of native species; wildlife corridor protection; and encourage reestablishment of wildlife. Values associated with wildlife and threatened and endangered wildlife are: occurrence of natural populations in a largely urban environment; aesthetic value of wildlife; and the recreational value of birding, hunting, and fishing.

3.11 Mineral Resources

Gravel for construction is the primary mineral resource of the study area. Locally available sources of gravel are essential to sustained growth in the region. The challenge facing the use of this mineral resource is the restoration of gravel pits into greenspaces for wildlife habitat and recreation. Committee priorities are: protection of mineral resources and provision for the smooth transition to other uses after mineral extraction. Values associated with mineral resources are: economic value; sustainable growth; and use as greenspace and wildlife habitat.

3.12 Land Suited for Commercial Development

Specific zones within the study area are suitable for commercial and industrial development. The improved transportation links within the region make the study area a desirable area for development. By locating commerce and industry away from culturally and ecologically sensitive areas and maximizing infill development, the economic benefits of increased employment opportunities will result in an expanded and diversified tax base which will in turn benefit the entire area. Committee priorities are: attract commercial and industrial development. Values associated with land suited for commercial development area: expanded and diversified tax base; and an increase in employment opportunities.

3.13 Scenery & Landscape

The study area contains noteworthy scenery and landscapes of Little Miami River Valley and adjacent hillsides. The rich seasonal variation of the landscape makes the Valley enjoyable year round. Committee priorities are: visual attraction; hillsides, and historic buildings. Values associated with scenery and landscapes are: seasonal variations; buffer effect; and pleasing sight lines and vistas.

3.14 Geology

The landscapes within the study area possess a unique set of geological features: the floodplain of the Little Miami River, historical river meanders, the Mariemont bluffs, and Kope slopes and hillsides. The floodplain provides flood storage and aquifer recharge, while all of the geological features provide scenic

interest and wildlife habitat. Committee priorities are: floodplains; Mariemont bluffs; and Kope slopes and hillsides. Values associated with geology are: flood storage and silt deposition; wildlife habitat; visually unique and interesting landforms; aquifers; and mineral resources.

Chapter 4 Green Infrastructure Concept Master Plan Recommendations

Early efforts by the Green Infrastructure Planning Committee initially identified 34 resource issues that were grouped into 14 natural and cultural resource priorities. The Committee identified values associated with each of the resource priorities, which were subsequently organized into eight value groups (values overlapped between some resources). The Green Infrastructure Concept Master Plan Recommendations described in this Chapter are organized around these eight value groups.

4.1 Outstandingly Remarkable Values (ORV)

Six of the eight value groups identified by the Green Infrastructure Committee correspond to the Outstanding Remarkable Values (ORVs) assigned to the Little Miami River under the national scenic rivers program: geology, historic and cultural resources, recreation and parklands, scenic quality, water quality, and fish and wildlife habitat. The Committee identified two additional value groups for the study area including: agriculture and communities and neighborhoods.

4.2 Recommendations Overview

Recommendations of the Green Infrastructure Concept Master Plan have two key applications: first, to guide refinement of alternatives, preliminary design work and mitigation development during Part B of the Eastern Corridor study and, secondly, to be used by local jurisdictions in guiding future land use and community plans. Protection measures for each value group, included as worksheets in Chapter 6, were developed for application to both these “design team” and “local planning” purposes. Protection measures address Committee concerns and expectations, and were developed to be in compliance with various local, state and federal regulations, including mitigation guidelines recommended by ODNR Scenic Rivers and other resource agencies during coordination conducted for the Eastern Corridor Tier 1 work. These measures will be refined, expanded and further developed as the Green Infrastructure Concept Master Plan and the Eastern Corridor project progress.

A summary of key protection measures for each of the value groups is presented below. Measures are listed by “Eastern Corridor project development” and “local planning” applications. Detailed descriptions of the protection measure are included in Chapter 6 Preliminary Mitigation Opportunities Inventory.

4.3 Recommended Protection Measures by Value Group

4.3.1 Agriculture

Eastern Corridor project development*:*

- Minimize bisection of farmland, preserve agricultural infrastructure, and provide access through transportation investment area;
- Consider hydrologic conditions in flood areas to preserve flood deposition of silt on agricultural lands;

- Incorporate agricultural landscapes into project design;
- Develop management controls for invasive species.

***Local planning**:*

- Establish agricultural easements;
- Develop a local historic agriculture program (such as a historical center) that may be used for education and attract tourism.

4.3.2 Communities and Neighborhoods

***Eastern Corridor project development**:*

- Configure the transportation corridor and transit hubs to optimize community cohesion and minimize displacement of people and businesses;
- Develop bike trails to connect with neighborhoods and recreation and link with existing and planned bike facilities in the area;
- Conduct noise studies and, where abatement is warranted, use aesthetic structures;
- Develop stream and wetland mitigation sites to be usable by local communities for passive recreation/education;
- During construction, develop appropriate measures for controlling noise and air quality impacts, and for providing adequate maintenance of traffic.

***Local planning**:*

- Create pedestrian friendly links between residences and commercial, recreational and other public use areas;
- Develop a local history program/center for education/tourism;
- Coordinate plans for commercial development and include measures such as: clean-up landfills and brownfields, create buffers between commercial development and residential areas to reduce noise and air pollution, and locate commercial/industrial development above the floodplain.

4.3.3 Geology

***Eastern Corridor project development**:*

- Conduct studies to identify sensitive geologic areas and avoid/minimize encroachment;
- Incorporate existing landforms into project design and viewshed, such as the Little Miami River and Mariemont Bluffs;
- Develop design measures that protect aquifer recharge;
- Protect sensitive areas from construction activities such as borrow and waste and construction staging.

***Local planning**:*

- Preserve and restore Kope hillsides and slopes by land acquisition, easements and reforestation;

- Develop zoning changes to limit development on steep slopes;
- Restore gravel pits and brownfield areas into greenspace for recreation, wildlife habitat or other use.

4.3.4 Historical & Cultural Resources

***Eastern Corridor project development**:*

- Conduct studies to locate and determine the significance of historic and archaeological resources in the area;
- Develop cultural resources mitigation in conjunction with stream and wetland mitigation;
- Protect sensitive cultural resource areas during construction.

***Local planning**:*

- Create a local program to develop the cultural history of the area;
- Preserve archaeological sites as part of existing and new greenspaces and parks;
- Encourage access to cultural sites by hiking and biking trails and providing interpretive signage.

4.3.5 Parkland, Greenspace and Recreation

***Eastern Corridor project development**:*

- Develop bike trails to connect with neighborhoods and link with existing and planned bike facilities in the area, and incorporate safety measures, such as shared use facility design;
- Develop stream and wetland mitigation sites to link with existing recreational areas and provide new passive recreational opportunities at the mitigation site;
- During construction, provide sufficient navigational warnings in the Little Miami River for canoeist safety.

***Local planning**:*

- Coordinate local recreation and park plans corridor-wide;
- Acquire new parks and greenspace;
- Develop zoning ordinances to limit access and development along the Little Miami River and other sensitive areas, except for recreational purposes;
- Evaluate new recreational opportunities for the area, such as new river access, hunting/fishing and/or outdoor education.

4.3.6 Scenery & Landscape

***Eastern Corridor project development**:*

- Design an aesthetic river crossing and transportation corridor through the Little Miami River valley, such as creating a gateway or scenic design, using natural medians, and/or developing vertical and horizontal alignments to fit in harmony with the existing landscape;
- Where noise abatement is warranted, use an aesthetic design or natural noise barrier;

- Incorporate existing landforms into the project landscaping/viewshed and use native vegetation for plantings;
- Locate and configure stream and wetland mitigation areas for aesthetic value.

***Local planning**:*

- Preserve scenic vistas along the Little Miami River and hillsides/bluffs by acquisition or easement;
- Clean-up landfills to improve scenic quality;
- Create greenspace buffers around commercial and industrial sites.

4.3.7 Water Quality (Streams, Aquifer and Floodplain)

Eastern Corridor project development:

- Develop design structures that protect the aquifer;
- Develop mitigation measures that protect surface waters such as use of natural stream channel design, use of 3-sided culverts and wetland restoration, creation or banking
- Develop and implement post construction stormwater management strategies into the project design;
- Evaluate flood control measures for critical areas in Newtown;
- Implement pollution prevention practices into operation and maintenance activities.

Local planning:

- Develop a private or public-sponsored stream/wetland bank;
- Create riparian buffers and preserve stream corridors through land acquisition or easements;
- Develop zoning ordinances that outline acceptable activities along stream corridors, aquifer recharge areas and other sensitive locations;
- Develop specific mechanisms for protecting streams and aquifers as part of the MS4 Stormwater Management Plan;
- Coordinate and expand watershed management efforts and stream monitoring;
- Clean-up and restore abandoned landfills in floodplain and aquifer areas;
- Reduce flooding by preserving and expanding wetlands, greenspace and agricultural land.

4.3.8 Wildlife, Fish, and Habitat

Eastern Corridor project development:

- Develop design to minimize loss of existing habitat and reduce habitat fragmentation;
- Construct underpasses or other structures for wildlife to safely cross transportation corridors;
- Incorporate existing woodlands, streams and other natural features into the project landscaping;

- Develop stream and wetland mitigation areas that provide habitat diversity, link with existing natural corridors, discourage invasive species and provide foraging and nesting areas for local wildlife;
- Use native vegetation for seeding and mulching, landscaping, and mitigation site vegetation;
- Implement operation and maintenance practices that minimize adverse affects on wildlife and habitat;
- Provide underpasses and overpasses for wildlife to safely cross roadways

Local planning:

- Develop a private or public-sponsored stream/wetland bank and include creation of wildlife habitat and wildlife management as of part of the plan;
- Preserve stream corridors, woodland and other greenspace areas through land acquisition or easements;
- Develop zoning ordinances to limit development along the Little Miami River and other sensitive areas used by wildlife.

4.4 Mitigation Opportunities in the Eastern Corridor Transportation Investment Area.

4.4.1 Preliminary Mitigation Opportunities Inventory

One application of the Green Infrastructure Concept Plan is to provide context for refinement of alternatives during Part B (Tier 2) of the Eastern Corridor study. Part A work for the project, documented in the Easter Corridor Tier 1 Draft Environmental Impact Statement, confirmed the boundaries of a transportation investment area (study area) that encompasses alternatives that will be further developed and refined in Part B. As part of the green infrastructure work, preliminary mitigation opportunities were identified within this transportation investment area. The Preliminary Mitigation Opportunities Inventory information, to be presented in a separate technical document has two key applications: first, to guide refinement of alternatives, preliminary design work and mitigation development during Tier 2 of the Eastern Corridor study and, secondly, to be used by local communities in guiding future land use planning, and public and private infrastructure and community development.

Summary information and preliminary mapping from the Preliminary Mitigation Opportunities Inventory mitigation are included in Chapter 6 of this Green Infrastructure Concept Master Plan. Overall, this inventory includes the following information:

1. Potential wetland restoration/creation opportunities
2. Riparian restoration opportunities
3. Riparian preservation/enhancement opportunities
4. Potential cultural resources mitigation opportunities

5. Local conservation projects and programs in the area
6. Preliminary protection measures worksheets
7. GIS data for existing features and mitigation opportunities

Mitigation opportunities were determined by evaluation of secondary source information and field studies conducted in Part A (Tier 1), and through reconnaissance field surveys, preliminary evaluation, and coordination with local landowners and jurisdictions conducted during the green infrastructure planning process.

4.4.2 Watershed Planning

The mitigation opportunities and mapping included in Chapter 6 are preliminary only, and will be refined, expanded and further developed as the green infrastructure plan and the Eastern Corridor project progress. One such refinement is recommendation to expand the green infrastructure plan to include a broader watershed-focused study area outside just the River Plains, and include evaluation of potential mitigation opportunities in the Lower East Fork watershed, specifically Hall Run and Shayler Run. These upper watersheds address areas of the Eastern Corridor Part B (Tier 2) transportation investment area, including the Eastgate area of Clermont County.

The Lower East Fork Watershed Management Plan identifies water resource protection strategies, including protection and restoration of riparian buffers. Further development of the green infrastructure plan to a watershed focus supports recommendations and objectives of resource agencies obtained through the Eastern Corridor Tier 1 work, including ODNR scenic rivers management objectives for the Little Miami River and OEPA watershed programs, and provides opportunity to link with local watershed planning efforts in Clermont County (Lower East Fork Watershed studies) and link MS4 stormwater management programs in Clermont County and Hamilton County with regulatory agency requirements.

4.4.3 Advanced Mitigation

Green infrastructure is an essential component of the advanced mitigation concept protecting important ecological, cultural and historic resources while supporting the corridor-wide economic development strategy. Advanced mitigation *(mitigation projects undertaken now in anticipation of future transportation project impacts)* should be implemented during the early stages of transportation planning.

By taking a proactive approach to mitigating impacts to the environment, high-quality sites that are under threat now can be protected by the following:

- Identify and select the best available sites for habitat and wetlands mitigation during the early planning process before transportation projects are implemented.
- Integrate habitat conservation and water quality protection with advanced mitigation strategies as elements of the corridor-wide green infrastructure.
- Integrate parks, cultural and historic sites with advanced mitigation strategies as a foundation of the greenway system.

By going beyond the minimum regulatory impact mitigation requirements, this advanced mitigation plan is an important part of the comprehensive approach to community development that puts resource protection into the overall corridor funding and financial strategy. In an area such as the Eastern Corridor, with significant redevelopment potential, strong community expectations, and regionally important natural resources, it is the best way to plan and design effective and responsive transportation components that can support and catalyze larger goals.

4.5 Implementation Strategies

4.5.1 Phased Development Approach

The challenge for the implementation of the Eastern Corridor Green Infrastructure Plan is to maximize opportunities and funding over a sustainable development time frame. The recommended approach toward fully funding the development of the plan is to phase it over time. At this point, the evolution of the plan has reached an important and significant juncture:

- The overall green infrastructure concept has been identified;
- There is an overall consensus supporting its development;
- The plan consists of elements that offer benefits to different groups of jurisdictions and stakeholders.

Given these facts, the project sponsors have the ability to take the implementation to the next level by securing funding. However, recognizing that there is no single source of funding, sponsors should strategically phase the development of the plan without compromising the overall concept. In other words, now that the concept is defined, individual elements of the plan should be funded and developed with the goal of a comprehensive greenway network resulting from various completed portions. It is important to begin showing tangible success as early as possible.

4.5.2 Match Projects with Specific Funding Sources

The Green Infrastructure Concept Master Plan is an essential element of a broader community development plan identified in the Eastern Corridor Land Use Vision Plan. Therefore, the Transportation Improvement District (TID) and the implementation partners should develop a

strategy to incorporate key components of the green infrastructure plan and local community development plans into the overall corridor implementation strategy.

Transportation, economic and community development funding available to the implementation partners can be utilized to implement these essential components of the land use vision plan consistent with the leveraging of private and public funding for the transportation development plan. For example, the green infrastructure concept plan identifies the need for community redevelopment and elimination of blighted areas at Old Fort and YWCA in Anderson Township, both eligible under the Community Development Block Grant program. By nesting the community development benefits to these neighborhoods into the overall green infrastructure development strategy, CDBG funding can be used as local match for funding other key elements of the plan. There are multiple combinations of sources and uses of funding, both public and private, that can be crafted into an implementation framework for the green infrastructure in the River Plains.

4.5.3 Finding the right mix

Recognizing that there are competing demands for funding sources, there are a variety of sources, many of which have traditionally not been applied for conservation purposes, which should be pursued. The key to success is to continuously target a variety of sources, and to match the nature of the project with the purpose or goal of the source of funding. Combining traditional recreation, greenspace and conservation funding with transportation and other public infrastructure investments reduces the amount of funding required from traditional funding sources.

4.5.4 Leverage Local Funding

The eight value groups identified by the Committee are a composite of different value elements or layers of values. These value layers are “bundled” into each value group. By focusing on the value elements in the value groups of the resource protection measures, local jurisdictions can fund protection of value layers across the range of green infrastructure components. For example, Park District funding of parkland/bike trail development could be combined with greenspace funding for acquisition of agricultural preservation easements and transportation funding for wetland conservation/mitigation to leverage local funding and attract other state and federal funds to the plan.

Chapter 5 Conclusions & Next Steps

5.1 Committee Goals & Objectives

The goal of the Green Infrastructure Committee is to create a balanced conservation master plan for the River Plains Focus Area that considers important natural and man-made resources and the practical needs of mitigating public works and other community development impacts through time. This important resource area has outstanding potential to be a unique demonstration of proactive environmental stewardship and allows transportation and other public works investments to contribute to conservation of important environmental resources and community development needs by:

- Balancing river plains conservation initiatives with community & neighborhood needs, and
- Creating a context for transportation investment alternative development and design.

The objectives of the Committee were to:

- Develop a Green Infrastructure Concept Master Plan for the River Plains Focus Area.
- Create a context for refinement of alternatives and design related to transportation investments.
- Identity preliminary mitigation opportunities in the transportation investment area.

Major Issues identified by the committee include:

- Protection/enhancement of the Little Miami River,
- Incorporate community/neighborhood needs,
- Respect individual property rights, and
- Delineate context for transportation investment area.

5.2 Committee Planning Process

In a series of public work sessions, the Green Infrastructure Committee initially identified 34 key issues related to resources which were grouped into 14 natural and cultural resource priorities: agriculture, aquifer, communities and neighborhoods, cultural resources, streams and rivers, hillsides, wetlands, floodplains and hydrology, parklands, wildlife, mineral resources, land suited for commercial development, scenery and landscape, and geology. Values associated with each of the resource priorities were then identified by the Committee, and subsequently organized into eight value groups. Preliminary protection measures were developed for the eight values groups, for ultimate use in two key applications: first, to guide refinement of alternatives, preliminary design work and mitigation development during Tier 2 of the Eastern Corridor study and, secondly, to be used by local jurisdictions in guiding future land use and community planning. Preliminary mitigation opportunities were then identified within the Eastern Corridor transportation investment area and then integrated into a network of existing and proposed greenspaces.

5.3 Committee Priorities:

The Committee has identified and prioritized key resource protection needs that have been focused into eight resource value groups:

- **Agriculture**: preserve access and minimize disruption to agricultural land while creating soil erosion and stormwater runoff buffers to protect important water resources and provide important habitat.
- **Communities & neighborhoods**: enhance connectivity in nearby communities through a network of pedestrian and bike trails to connect to recreation, commercial and residential districts and preserve and expand greenspace to enhance community identity and buffer new commercial development and roadways.
- **Geology**: preserve regionally significant hillside and floodplain areas.
- **Historical & Cultural Resources**: identify and preserve important historic & archeological sites and carefully link with park and greenspace to enhance educational value of these resources.
- **Recreation, Greenspace & Parkland**: expand recreation opportunities, parkland and greenspace areas by incorporating wetlands, stream buffers, wooded hillsides and creating a network of walking and biking trails to link neighborhoods, parks, and public open space.
- **Scenery and Landscape**: create multi-purpose buffers around expanding commercial and industrial areas; conserve viewsheds and key vistas; enhance buffer of Little Miami River.
- **Water Quality**: preserve/create wetlands to filter stormwater improve water quality and enhance aquifer recharge.
- **Wildlife, Fish and Habitat**: reestablish important habitat and provide greenway connections, buffers and wetland/stream restoration to create wildlife corridors and habitat.

5.4 Next Steps

The Green Infrastructure Concept Master Plan, as developed by the Green Infrastructure Committee, will form the basis for the following recommended next steps:

1) Develop the Green Infrastructure implementation management framework under the leadership of the Hamilton County Park District with support from the TID and its implementation partners, resource agencies and local jurisdictions.

2) Coordinate the green infrastructure concept plan developed by the Committee with ODNR, OEPA, ODOT and other resource agencies and local jurisdictions.

3) Incorporate watershed management into the green infrastructure plan that links to, coordinates between, and expands upon existing local watershed planning efforts in Clermont County and initiate local watershed planning in the Hamilton County area of the corridor.

4) Expand the green infrastructure plan to include a broader watershed-focused study area outside just the River Plains, and include evaluation of potential mitigation opportunities in the Lower East Fork watershed, specifically Hall Run and Shayler Run. These upper watersheds address areas of the Eastern Corridor Part B (Tier 2) transportation investment area, including the Eastgate area of Clermont County.

5) Incorporate green infrastructure concept plan recommendations into the Part B (Tier 2) Eastern Corridor multi-modal transportation projects scope and work plan.

6) Building on mitigation opportunities inventory, refine and develop advanced mitigation banking strategies that can support corridor-wide approach to economic and community development.

7) Conduct appropriate field studies for further development of protection measures and mitigation opportunities, including:
   - Archaeological investigations for cultural resources opportunities,
   - Hydrological/drainage area and floodplain studies for wetland opportunities,
   - Fluvial geomorphologic studies for protection of Little Miami River geological values,
   - Delineation of riparian buffers for stream restoration and preservation, and
   - Other appropriate studies based on further planning and development efforts, Committee input, and coordination with transportation and resource agencies.

Chapter 6.1
Hamilton County Transportation Improvement District Resolution

RESOLUTION ESTABLISHING GREEN INFRASTRUCTURE PLANNING COMMITTEE RELATIVE TO THE HAMILTON COUNTY TRANPORTATION IMPROVEMENT DISTRICT'S EASTERN CORRIDOR MULTI-MODAL PROJECT PE/EIS WORK (PARTS A & B)

WHEREAS, the Hamilton County Transportation Improvement District (HCTID) has recognized from the beginning of the Eastern Corridor project that attention and emphasis be placed on consideration of avoidance, minimization and mitigation of impacts to important man-made and natural features in the area;

WHEREAS, there is expectation by the project stakeholders, local communities, and resource agencies that mitigation efforts be carried forward through Part A of the Eastern Corridor PE/EIS work phase to continued, more detailed development in Part B;

WHEREAS, the HCTID has identified the need to develop a proactive environmental stewardship approach to environmental mitigation for the project in conjunction with more detailed alignment development, preferred alternative selection, permit preparation, agency coordination, and stakeholder and public input efforts to be conducted during Part B work as important in supplementing and advancing the scope of the Eastern Corridor Multi-Modal Project PE/EIS work, consistent with the expectations and needs of the project partners and the public;

WHEREAS, the HCTID desires the mitigation plan be consistent with state and federal requirements, and administered at the local level in conjunction with other local preservation, mitigation or enhancement plans, using a combination of local, state and/or federal funding, as applicable;

WHEREAS, the HCTID believes joint planning of project mitigation with on-going local resource protection efforts will provide framework for effective implementation of the mitigation plan and multi-jurisdictional (and multi-agency) participation in the plan is in the best interest of advancing the Eastern Corridor Multi-Modal Project; and

WHEREAS, key components of the Eastern Corridor environmental mitigation plan should consider integrating mitigation measures developed for the project with local land use, watershed, greenspace, floodplain, aquifer and other environmental stewardship programs for habitat, water quality, and important community resources and which may further provide opportunity to utilize locally available resources outside traditional transportation funding through flexible local match and other program sources.

NOW, THEREFORE, BE IT RESOLVED that the Eastern Corridor Green Infrastructure Planning Committee shall be established and members selected consistent with and in conjunction with the project development and program management needs of the Eastern Corridor Project.

It is found and determined that all formal actions of this Board concerning and relating to the adoption of this resolution were adopted in an open meeting of this Board, and that all deliberations of this Board that resulted in such formal action, were in meetings open to the public, in compliance with the law, including Section 121.22 of the Ohio Revised Code.

Adopted at a regularly adjourned meeting of the Board of Trustees of the Hamilton County Transportation Improvement District, Hamilton County, Ohio, this 10th day of May, 2004.

Hamilton County Transportation Improvement District
Chairman

Attest:

William W. Brayshaw
Hamilton County Transportation Improvement District
Secretary/Treasurer

Motion to Pass Resolution: William Brayshaw

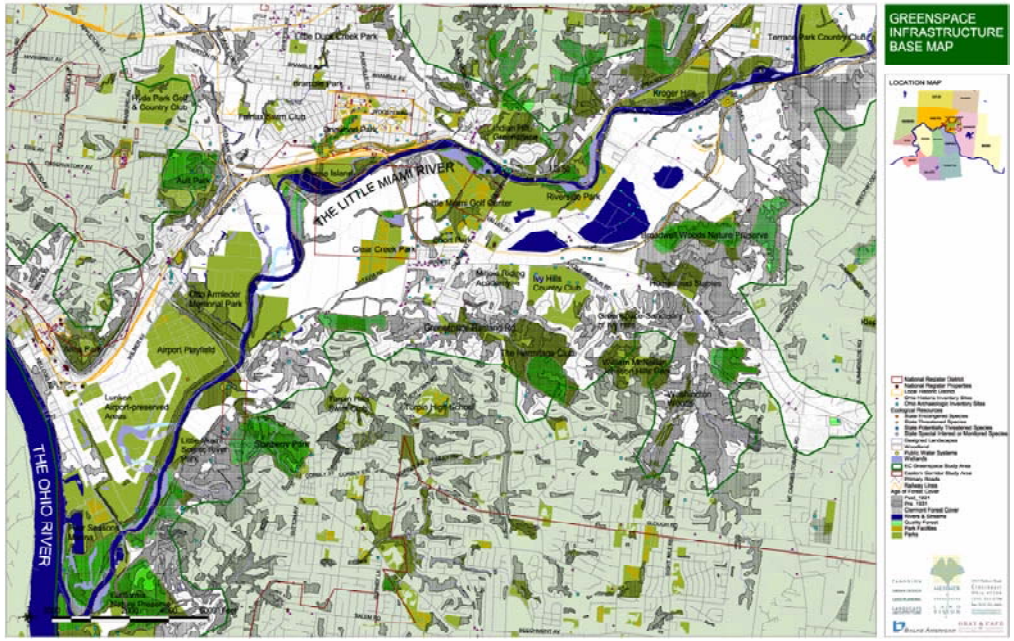
Seconded by: Todd Portune

HAMILTON COUNTY
TID MINUTES
MAY 10 2004
IMAGE # 7

Chapter 6.2
Resource Protection Priority Ranking

The Eastern Corridor

PE/EIS
Green Infrastructure Planning Committee



Resource Protection Priority Ranking

		EMPHASIS	HIGH	MED	LOW
1.	AGRICULTURAL LANDS PRESERVATION	7	5	5	
2.	AGRICULTURAL LANDS ACCESS	2	5	2	3
3.	AGRICULTURAL LANDS EXPANSION	1	3	1	6
4.	AQUIFER PROTECTION	6	10		
5.	AQUIFER RECHARGE RESTORATION & EXPANSION	2	4	4	1
6.	ARCHAEOLOGIC RESOURCE PROTECTION	1	3	6	1
7.	BIKE & WALKWAYS EXPANSION	1	2	6	2
8.	COMMUNITY ACCESS: PROTECTION & EXPANSION		2	6	2
9.	COMMUNITY FIRE & SAFETY PROTECTION	1	5	4	1
10.	COMMUNITY UTILITY SYSTEMS: PROTECTION & EXPANSION		2	7	1
11.	FLOOD PROTECTION	4	7	2	1
12.	HILLSIDES PROTECTION	1	3	5	2
13.	HILLSIDES RESTORATION & EXPANSION		1	5	4
14.	HISTORIC RESOURCE PROTECTION	1	4	5	1
15.	MINERAL RESOURCE PROTECTION	3	3	3	4
16.	NEIGHBORHOOD PROTECTION: AIR QUALITY	1	7	3	
17.	NEIGHBORHOOD PROTECTION: NOISE	1	5	5	
18.	NEIGHBORHOOD PROTECTION: PEDESTRIAN ACCESS / SAFETY	2	6	3	1
19.	NEIGHBORHOOD PROTECTION: VEHICULAR ACCESS / SAFETY	4	5	5	
20.	NEIGHBORHOOD PROTECTION: VIEWS		3	6	2
21.	PARKLANDS PRESERVATION	1	5	5	2
22.	PARKLANDS EXPANSION		1	3	5
23.	RARE SPECIES PROTECTION		4	4	2
24.	SCENIC RIVER CORRIDOR VIEW PROTECTION	1	5	4	1
25.	SCENIC RIVER CHANNEL VIEW PROTECTION		1	6	3
26.	STORM WATER RUNOFF PROTECTION	1	7	3	
27.	STREAM EDGE PROTECTION	2	4	5	1
28.	STREAM FOREST RESTORATION & EXPANSION		2	6	1
29.	WILD LIFE CORRIDOR PROTECTION	1	5	3	2
30.	WETLANDS PROTECTION	2	3	7	
31.	WETLANDS RESTORATION & EXPANSION		4	4	2
32.	ECONOMIC DEVELOPMENT EXISTING	1		4	
33.	ECONOMIC DEVELOPMENT FUTURE	2	3	3	
34.	NEIGHBORHOODS & BLIGHT			3	3

APPENDIX 6.2
RESOURCE PROTECTION PRIORITY RANKING

Chapter 6.3
Summary of Resource Priorities + Values to Protect

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

The Eastern Corridor

SUMMARY OF RESOURCE PRIORITIES + VALUES TO PROTECT

RESOURCE GROUP	COMMITTEE PRIORITIES	ASSOCIATED CHARACTERISTICS / VALUES TO PROTECT
AGRICULTURE	PRESERVATION ACCESS EXPANSION	• HISTORIC AGRICULTURAL USE • AIR QUALITY • NOISE REDUCTION SEASONAL • AESTHETIC LMR BOTTOMLAND • ECONOMIC VALUE / JOBS • WILDLIFE HABITAT
AQUIFER	GROUNDWATER PROTECTION RECHARGE RESTORATION / EXPANSION	• GROUNDWATER SUPPLY • GROUNDWATER QUALITY • CLASS I AQUIFER HIGH PRODUCTIVITY • OEPA WELLHEAD PROTECTION AREA – INDIAN HILL, MILFORD • INDIVIDUAL OEPA PUBLIC WATER SUPPLY WELLS IN THE AREA – PARKS, TOWNSHIP FIELDS AND TAVERN • WATER FOR AGRICULTURE
COMMUNITIES & NEIGHBORHOOD PROTECTION	ACCESS PROTECTION / EXPANSION FIRE SAFETY AND PROTECTION UTILITY SYSTEMS PROTECTION & EXPANSION NOISE IMPACT PROTECTION PEDESTRIAN ACCESS / SAFETY VEHICULAR ACCESS / SAFETY	• FIRE SAFETY • EMERGENCY RESPONSE TIMES • THROUGH-TRAFFIC & CONGESTION REDUCTION • COMMUNITY COHESION / SENSE OF IDENTITY / QUALITY OF LIFE • PROPERTY VALUES • DISPLACEMENT OF PEOPLE, BUSINESS, FARMS • PROTECT / RE-ESTABLISH CRITICAL LINKS (PHYSICAL, SOCIAL, ECONOMIC) • GREENSPACE CONNECTIVITY / PEDESTRIAN SAFETY • ACCESS TO BIKE PATHS
CULTURAL RESOURCES	ARCHAEOLOGICAL PROTECTION HISTORIC RESOURCE PROTECTION	• EDUCATIONAL VALUE AND SENSE OF PRIDE IN HISTORIC / PREHISTORIC COMPONENTS • PREHISTORY VALUE OF USE / OCCUPATION BY EARLIER CULTURES • POTENTIAL SACRED VALUE TO NATIVE AMERICANS
STREAMS & RIVERS	SCENIC RIVER CORRIDOR VIEW PROTECTION SCENIC RIVER CHANNEL VIEW PROTECTION STREAM EDGE PROTECTION STREAM FOREST RESTORATION / EXPANSION	• RECREATIONAL VALUE • AESTHETIC VALUE – TO LMR USER AND ADJACENT COMMUNITIES • EDGE PROTECTION HELPS STABILIZE STREAMBANK & REDUCES EROSION • RIPARIAN CORRIDOR RESTORATION HELPS TO IMPROVE WATER QUALITY • AQUATIC SPECIES HABITAT IMPROVEMENT HELPS TO INCREASE DIVERSITY • STREAM FOREST RESTORATION HELPS TO IMPROVE WATER QUALITY & HABITAT • TOURISM POTENTIAL • HUNTING / FISHING
HILLSIDES	PROTECTION RESTORATION / EXPANSION	• NATURAL GEOLOGIC VALUE • REDUCE EROSION • AESTHETIC VALUE • WILDLIFE HABITAT • AIR QUALITY • SCENIC BUFFER
WETLANDS	PROTECTION RESTORATION / EXPANSION	• STORMWATER MANAGEMENT • FLOOD CONTROL • WILDLIFE AND PLANT HABITAT • AESTHETICS • IMPROVES WATER QUALITY (STREAMS AND AQUIFER) – NATURAL FILTERS
FLOODPLAINS & HYDROLOGY	FLOOD PROTECTION STORM WATER RUNOFF PROTECTION	• REDUCTION IN ECONOMIC LOSS • LIMITED DEVELOPMENT POTENTIAL (PROTECT AGRICULTURAL LAND) • HABITAT
PARKLANDS & GREEN SPACE RECREATION	PRESERVATION & EXPANSION BIKE / WALKWAY EXPANSION RECREATIONAL OPPORTUNITIES RIVER RESOURCE	• AESTHETIC • NATURAL BUFFERS • WILDLIFE HABITAT • WILDLIFE OBSERVATION • SCENIC VISTAS • RECREATION - BIKE RIDING / CANOEING / BOATING / PHOTOGRAPHY / ORGANIZED SPORTS • HUNTING / FISHING • TOURISM • CURRENT ACCESSIBILITY
WILDLIFE THREATENED/ENDANGERED SPECIES	NATIVE SPECIES PROTECTION (FLORA / FAUNA) WILDLIFE CORRIDOR PROTECTION ENCOURAGE REESTABLISHMENT	• NATURAL POPULATIONS IN A LARGELY URBAN AREA • AESTHETIC / RECREATIONAL VALUE (BIRD WATCHING, FISHING) • DIVERSITY OF SPECIES • HABITAT
MINERAL RESOURCES	PROTECTION TRANSITIONAL USE	• ECONOMIC VALUE • ESSENTIAL TO SUSTAINED GROWTH • TRANSITIONAL USE TO GREENSPACE / OTHER LAND USES • HABITAT • HUNTING / FISHING • AQUIFER PROTECTION
EXISTING LAND SUITED FOR COMMERCIAL DEVELOPMENT	ATTRACT COMMERCIAL GROWTH ATTRACT CLEAN OFFICE & INDUSTRIAL GROWTH	• EXPANDED/DIVERSIFIED TAX BASE • INCREASE EMPLOYMENT OPPORTUNITIES • SMALL BUSINESS / QUALITY OF LIFE • TOURISM
SCENIC RESOURCES / LANDSCAPE	VISUAL ATTRACTION HILLSIDES HISTORIC BUILDINGS	• SEASONAL VARIATIONS • BUFFER EFFECT • SIGHT LINES / VISTAS • RIVER CHANNEL VIEWS • TOURISM RELATIONSHIP • AQUIFER PROTECTION
GEOLOGY	FLOODPLAIN MARIEMONT BLUFFS KOPE SLOPES / HILLSIDES	• UNIQUE HILLSIDE GEOLOGY • FLOOD STORAGE • HABITAT • VISUAL UNIQUE / INTERESTING • AQUIFER (GRAVEL / SAND DEPOSITS • MINERAL RESOURCES

This table lists the resources and priorities identified by the Committee to date.
The next step is to identify and list the characteristics that make each resource valuable.
Then discuss how the value of each resource is important to your interests and how each may apply to the whole range of resources.
From this list of characteristics/values to protect we can then develop measures and design strategies that can be used to protect the values of each resource.

APPENDIX 6.3

SUMMARY OF RESOURCE PRIORITIES + VALUES TO PROTECT

Chapter 6.4
14 Resource Priority Descriptions

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

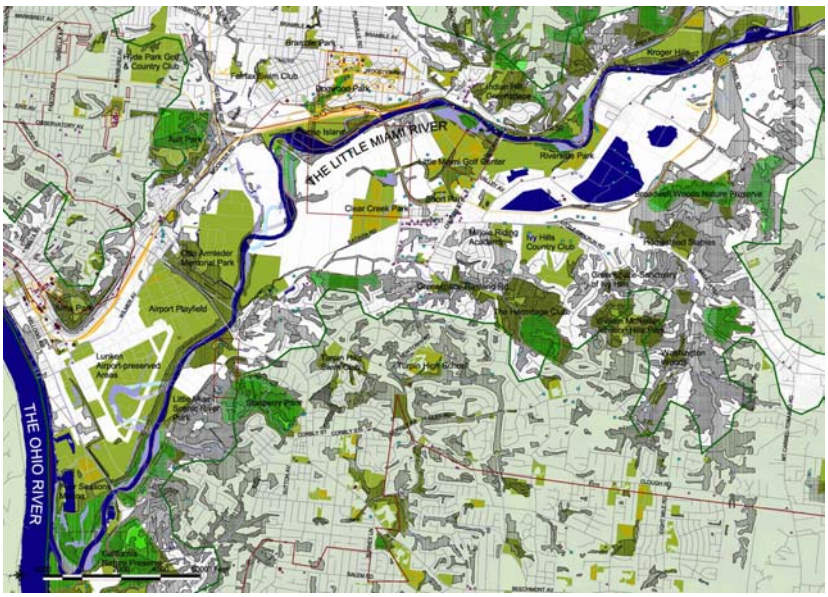
AGRICULTURAL RESOURCES





OVERVIEW

THE LITTLE MIAMI RIVER VALLEY HAS A LONG ESTABLISHED HISTORY AND TRADITION OF AGRICULTURAL LAND USE AND CULTURE THAT DATES AT LEAST BACK TO 1785. NATIVE AMERICANS ALSO PRACTICED AGRICULTURE WITHIN THE RIVER VALLEY.



PRIORITIES

ACCESS	PRESERVATION	EXPANSION

VALUES +/-

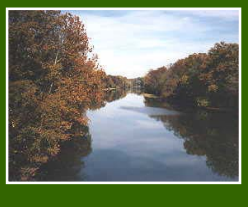
HISTORIC AGRICULTURAL USE
AIR QUALITY
NOISE REDUCTION SEASONAL
AESTHETIC LMR BOTTOMLAND & CROPLAND
ECONOMIC VALUE / JOBS
WILDLIFE HABITAT

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

AQUIFER RESOURCES

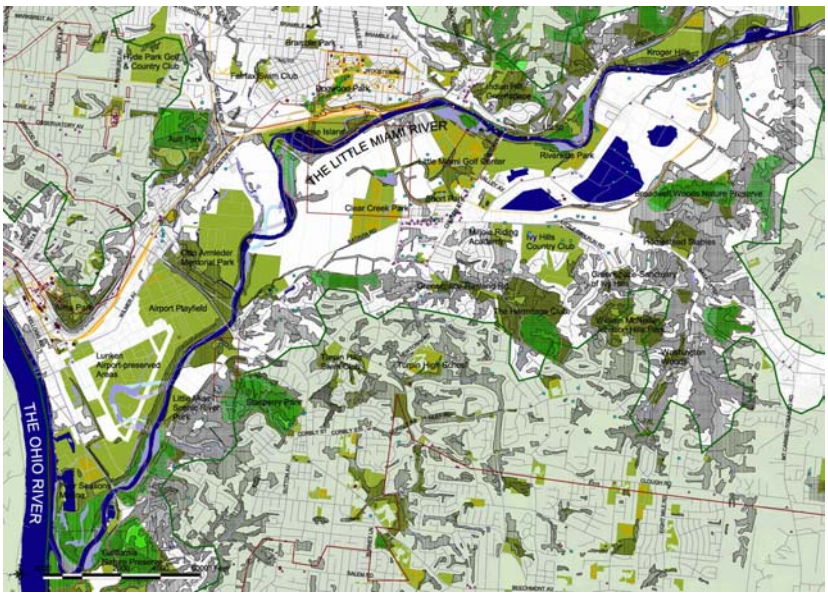






OVERVIEW

THE LITTLE MIAMI RIVER AQUIFER IS AN IMPORTANT NATURAL RESOURCE FOR THE PROVISION OF SAFE DRINKING AND POTABLE WATER FOR SOME COMMUNITIES AND IRRIGATION WATER FOR AGRICULTURE.



PRIORITIES

PROTECTION	GROUND WATER RECHARGE	RESTORATION & EXPANSION

VALUES +/-

GROUNDWATER SUPPLY
GROUNDWATER QUALITY PROTECTION
CLASS I AQUIFER / HIGH PRODUCTIVITY
OEPA WELLHEAD PROTECTION AREA – INDIAN HILL, MILFORD
INDIVIDUAL OEPA PUBLIC WATER SUPPLY WELLS IN THE AREA – PARKS, TOWNSHIP, TAVERN, ETC
WATER FOR AGRICULTURE

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

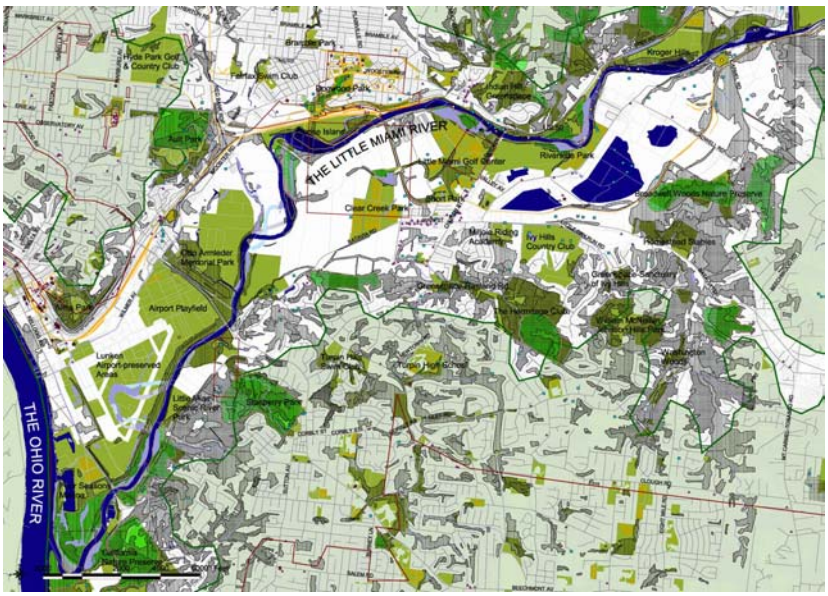
COMMUNITIES & NEIGHBORHOODS





OVERVIEW

THE MANY NEIGHBORHOODS AND COMMUNITIES IN AND ADJACENT TO THE LITTLE MIAMI RIVER VALLEY NEED THEIR QUALITY OF LIFE PROTECTED AND ENHANCED. ADDRESSING PRIORITY LOCAL NEEDS IS ESSENTIAL TO CREATING A BALANCED GREENSPACE AND COMMUNITY PLAN.



PRIORITIES

ACCESS PROTECTION / EXPANSION	UTILITY SYSTEMS PROTECTION & EXPANSION	PEDESTRIAN ACCESS / SAFETY
FIRE SAFETY AND PROTECTION	NOISE IMPACT PROTECTION	VEHICULAR ACCESS / SAFETY

VALUES +/-

FIRE SAFETY / EMERGENCY RESPONSE TIMES
COMMUNITY COHESION / SENSE OF IDENTITY / QUALITY OF LIFE
PROPERTY VALUES PROTECTION
AVOID DISPLACEMENT OF PEOPLE, BUSINESSES, FARMS
ELIMINATE THROUGH-TRAFFIC CONGESTION
PROTECT CRITICAL LINKS (PHYSICAL, SOCIAL, ECONOMIC)
GREENSPACE CONNECTIVITY / PEDESTRIAN SAFETY / NEW BIKEWAYS & TRAILS

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

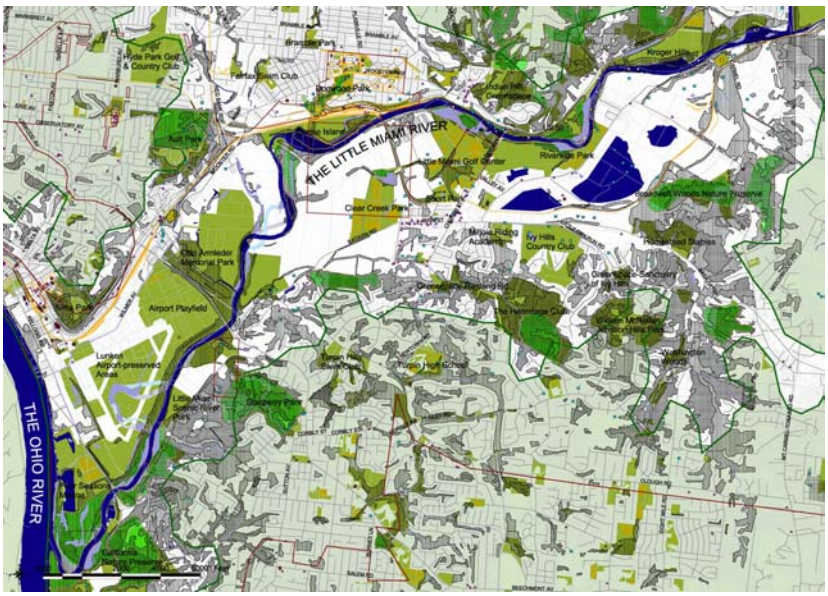
CULTURAL RESOURCES





OVERVIEW

THE CULTURE OF THE LITTLE MIAMI RIVER VALLEY IS DIRECTLY LINKED TO THE HISTORY OF THE LAND AND THE PEOPLE WHO HAVE LIVED THERE. PROTECTING HISTORIC AND ARCHEOLOGIC RESOURCES IS IMPORTANT IN ORDER TO CONNECT THE PAST TO THE PRESENT.



PRIORITIES

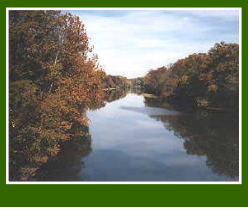
ARCHAEOLOGICAL PROTECTION	HISTORIC RESOURCE PROTECTION

VALUES +/-

EDUCATIONAL VALUE AND SENSE OF PRIDE IN HISTORIC/PREHISTORIC COMPONENTS
PREHISTORY VALUE OF USE/OCCUPATION BY EARLIER CULTURES
POTENTIAL SACRED VALUE TO NATIVE AMERICANS

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

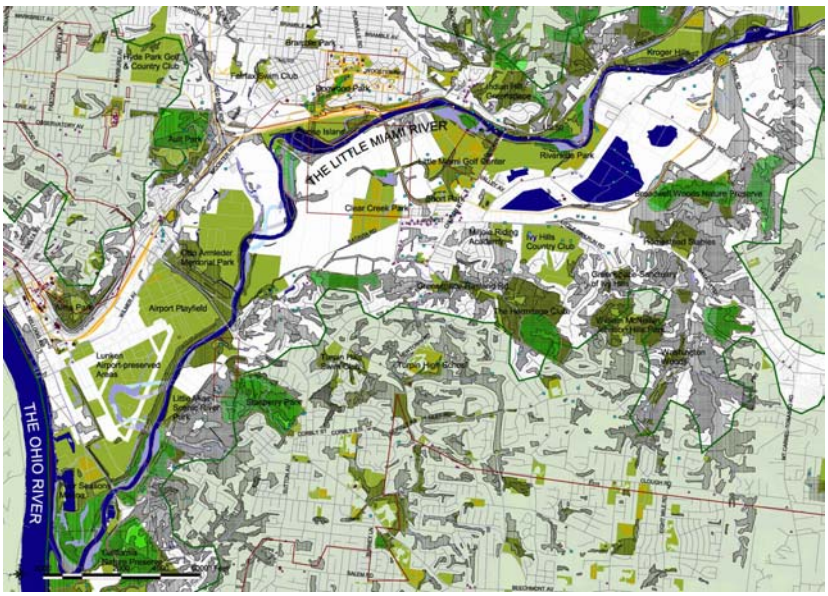
STREAMS & RIVERS





OVERVIEW

THE LITTLE MIAMI RIVER IS ONE OF THE MOST PROMINENT ELEMENTS IN THE VALLEY. IT IS PART OF THE NATIONAL WILD & SCENIC RIVERS SYSTEM AND THE OHIO NATURAL AREAS & SCENIC RIVERS PROGRAM. THIS SECTION OF THE RIVER IS SPECIFICALLY DESIGNATED AN "OHIO SCENIC AND NATIONAL RECREATIONAL AREA". IT IS A VALUED NATURAL RESOURCE FOR ECOLOGICAL, RECREATIONAL AND CULTURAL PURPOSES.



PRIORITIES

SCENIC RIVER CORRIDOR VIEW PROTECTION	**SCENIC RIVER CHANNEL VIEW PROTECTION**	**STREAM FOREST RESTORATION / EXPANSION**
	RIVER / STREAM EDGE PROTECTION	**RIVER / STREAM EDGE RESTORATION**

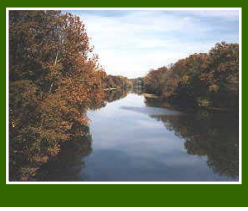
VALUES +/-

RECREATION
AESTHETIC – TO MULTIPLE USERS AND ADJACENT COMMUNITIES
STREAM EDGE PROTECTION STABILIZES STREAMBANK, REDUCES EROSION
RIPARIAN CORRIDOR RESTORATION HELPS TO IMPROVE WATER QUALITY
RIVER / STREAM FOREST RESTORATION HELPS TO IMPROVE WATERY QUALITY & HABITAT
AQUATIC SPECIES HABITAT IMPROVEMENT INCREASES DIVERSITY IN WILDLIFE CORRIDORS
RIVER / STREAM EDGE RENOVATION IMPROVES HABITAT

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

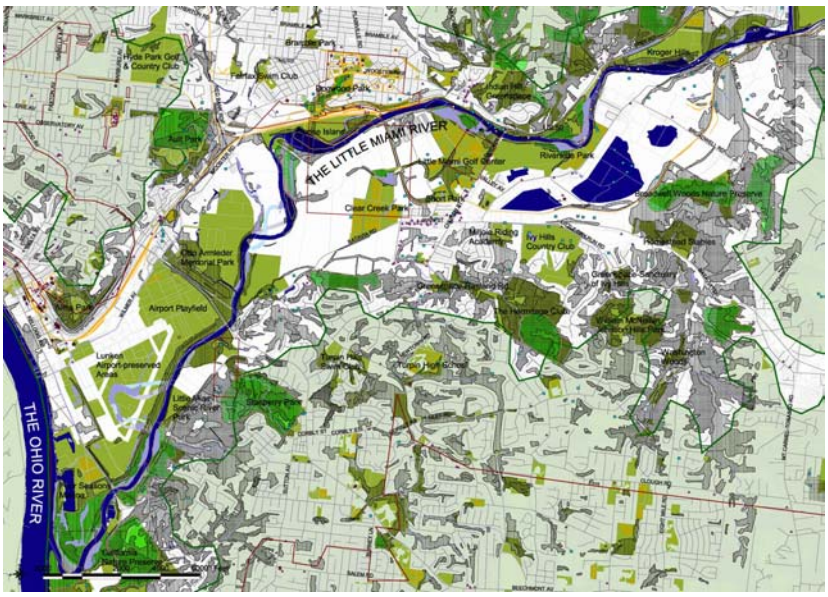
HILLSIDES




OVERVIEW

THE HILLSIDES OF THE LITTLE MIAMI RIVER VALLEY ARE A VITAL RESOURCE AND ARE AN IMPORTANT PART OF NATURAL, ECOLOGIC AND HYDROLOGIC PROCESSES. THEY PROVIDE OPPORTUNITIES FOR GREEN INFRASTRUCTURE CONSERVATION DUE TO THEIR DEVELOPMENT CONSTRAINTS. PROTECTION, RESTORATION AND EXPANSION OF STREAMSIDE FORESTS HELP STABALIZE STEEP SLOPES AND THE GEOMORPHOLOGY OF THE RIVER.



PRIORITIES

PROTECTION	RESTORATION & EXPANSION

VALUES +/-

NATURAL GEOLOGIC VALUE
REDUCE EROSION
AESTHETIC VALUE
WILDLIFE HABITAT
AIR QUALITY
SCENIC BUFFER

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

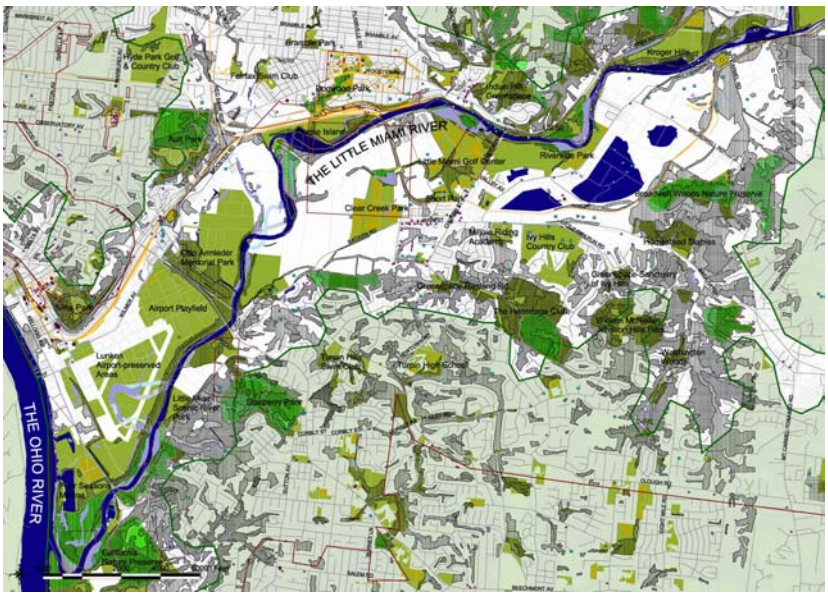
WETLANDS





OVERVIEW

WETLANDS ARE AN INTEGRAL PART OF THE LITTLE MIAMI RIVER VALLEY'S NATURAL SETTING. MANY HAVE BEEN LOST THROUGH DEVELOPMENT AND LOWLANDS DRAINAGE PRACTICES. THEIR UNIQUE VEGETATIVE QUALITIES ACT AS A FILTER FOR THE ENVIRONMENT, MANAGE STORMWATER RUNOFF AND CREATE HABITATS FOR WILDLIFE AND AQUATIC SPECIES.



PRIORITIES

PROTECTION	RESTORATION & EXPANSION

VALUES +/-

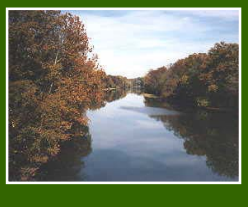
STORMWATER MANAGEMENT
FLOOD CONTROL
WILDLIFE AND PLANT HABITAT
AESTHETICS
IMPROVES WATER QUALITY OF RIVERS, STREAMS & THE AQUIFER
SERVE AS NATURAL FILTERS

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

FLOOD PLAIN & HYDROLOGY

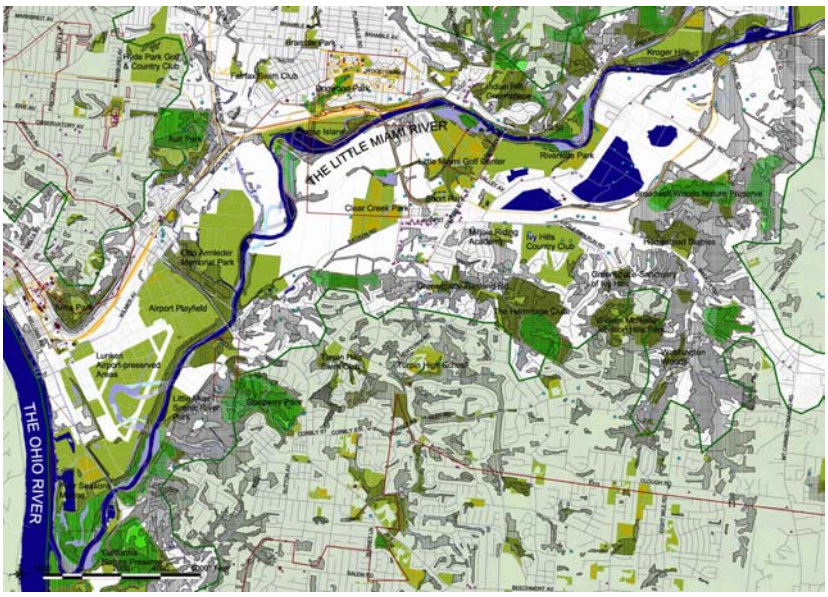






OVERVIEW

THE MOVEMENT OF WATER IS A PROMINENT NATURAL PROCESS IN THE LITTLE MIAMI RIVER VALLEY. BALANCING THE MANAGEMENT OF WATER PROCESSES AND PROTECTING OTHER RESOURCES AND COMMUNITY ASSETS IS AN IMPORTANT ENDEAVOR.



PRIORITIES

FLOOD PROTECTION

STORM WATER RUNOFF PROTECTION

VALUES +/-

REDUCTION IN ECONOMIC LOSS
LIMITED DEVELOPMENT POTENTIAL (PROTECT AGRICULTURAL LAND)
HABITAT

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

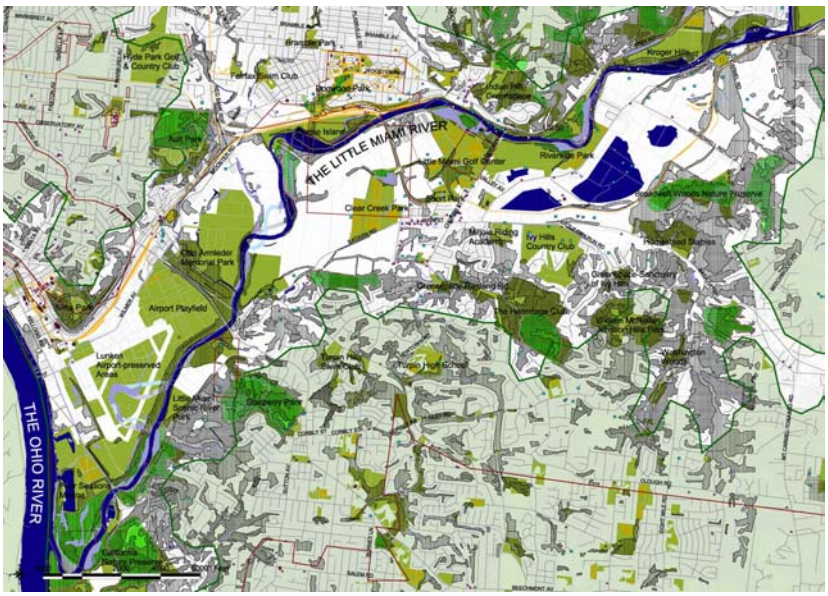
PARKLANDS GREENSPACE & RECREATION





OVERVIEW

GREENSPACE IS AN IMPORTANT LAND USE AND VALUEABLE RESOURCE. RECREATIONAL OPPORTUNITIES, CONSERVATION / EXPANSION OF NATURAL HABITAT, AND SCENIC VALUE ARE ONLY A FEW EXAMPLES OF THE VALUE OF GREENSPACE.



PRIORITIES

PRESERVATION & EXPANSION	**BIKE / WALKWAY EXPANSION**	**RECREATIONAL OPPORTUNITIES RIVER RESOURCE**

VALUES +/-

AESTHETICS	**CANOEING/BOATING**
NATURAL BUFFERS	**FISHING**
WILDLIFE HABITAT (IN PART)	**PHOTOGRAPHY**
SCENIC VISTAS	**TOURISM**
WILDLIFE OBSERVATION	**CURRENT ACCESSIBILITY**
BIKE RIDING	**ORGANIZED SPORTS**

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

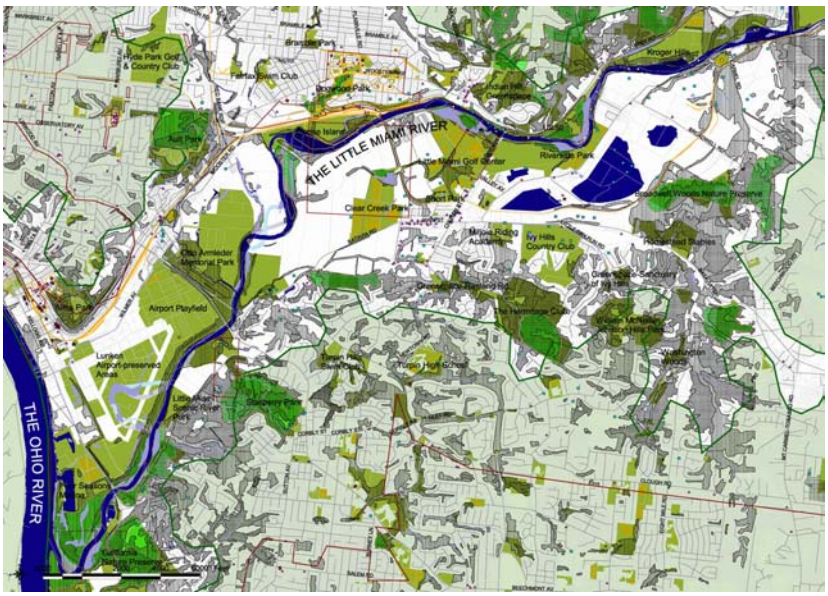
WILDLIFE THREATENED / ENDANGERED SPECIES





OVERVIEW

THE LITTLE MIAMI RIVER VALLEY IS AN IMPORTANT NATURAL HABITAT FOR WILDLIFE AND PLANTLIFE INCLUDING THREATENED AND ENDANGERED SPECIES. PROTECTING THIS VALUEABLE RESOURCE SHOULD BE TAKEN INTO ACCOUNT AS THIS AREA FACES CHANGE IN THE FUTURE.



PRIORITIES

NATIVE SPECIES PROTECTION (FLORA / FAUNA)	WILDLIFE CORRIDOR PROTECTION	ENCOURAGE REESTABLISHMENT

VALUES +/-

NATURAL POPULATIONS IN A LARGELY URBAN AREA AESTHETIC/ RECREATIONAL VALUE (BIRDING,FISHING)
DIVERSITY OF SPECIES
HABITAT

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

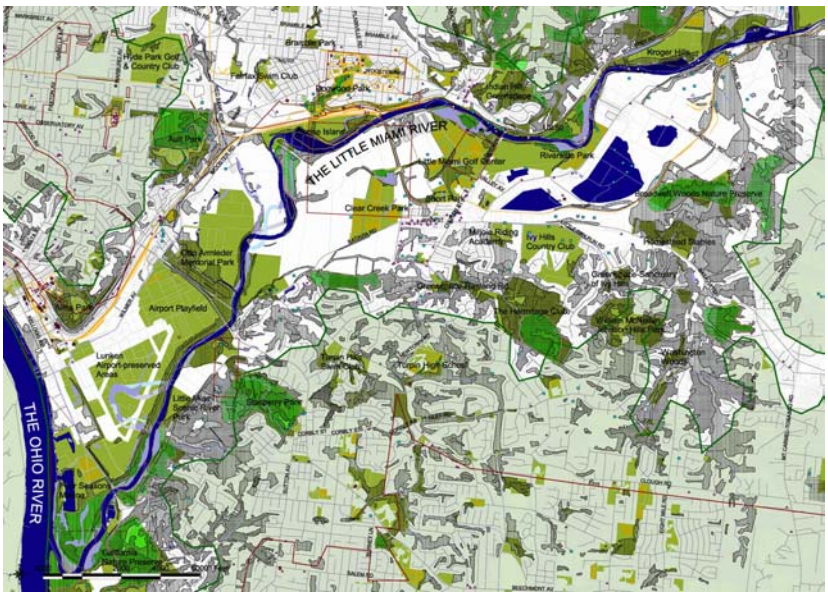
MINERAL RESOURCES





OVERVIEW

THE MINERAL RESOURCES IN THE LITTLE MIAMI RIVER VALLEY ARE AN ECONOMIC AND NATURAL COMMODITY. EXTRACTING THIS RESOURCE MUST BE SENSITIVE TO THE NATURAL ENVIRONMENT AND ITS TRANSITION TO OTHER LAND USES CAN BE AN OPPORTUNITY.



PRIORITIES

PROTECTION	TRANSITION

VALUES +/-

ECONOMIC VALUE
ESSENTIAL TO SUSTAINED GROWTH
TRANSITIONAL USE TO GREENSPACE
HABITAT

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

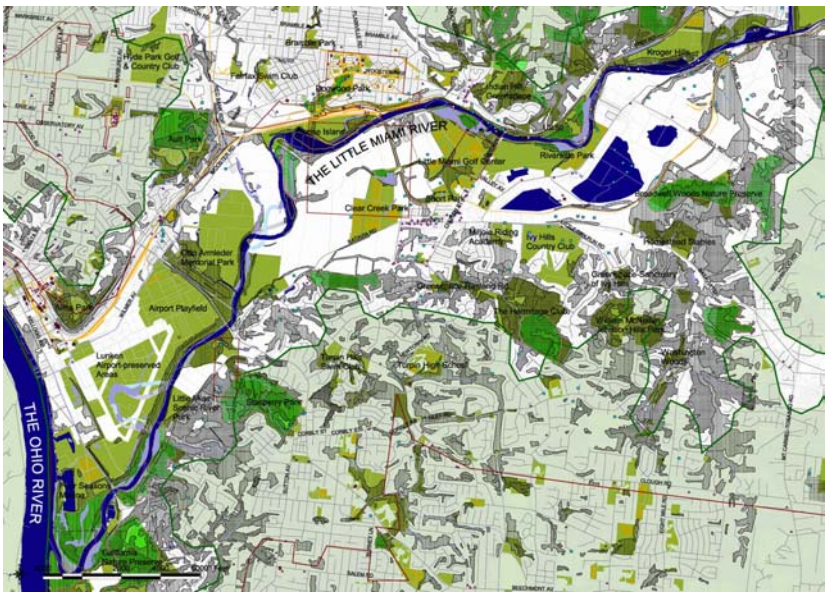
LAND SUITED FOR COMMERCIAL DEVELOPMENT





OVERVIEW

THE SOUTHEAST REGION OF CINCINNATI IS UNDERGOING A LOT OF CHANGE. LAND USES WILL CHANGE AND TRANSITION AS THE NEEDS OF COMMUNITIES GROW AND MOVE FORWARD. IT IS IMPORTANT TO IDENTIFY, ASSESS AND PLAN FOR COMMERCIAL GROWTH IN TANDOM WITH PROTECTING THE VARIOUS RESOURCES IN THE LITTLE MIAMI RIVER VALLEY.



PRIORITIES

**ATTRACT
COMMERCIAL/INDUSTRIAL
GROWTH**

VALUES +/-

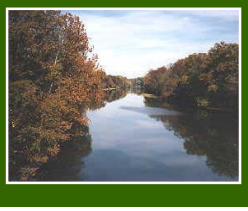
**EXPANDED/DIVERSIFIED TAX BASE
INCREASE EMPLOYMENT OPPORTUNITIES**

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

SCENIC RESOURCES & LANDSCAPE

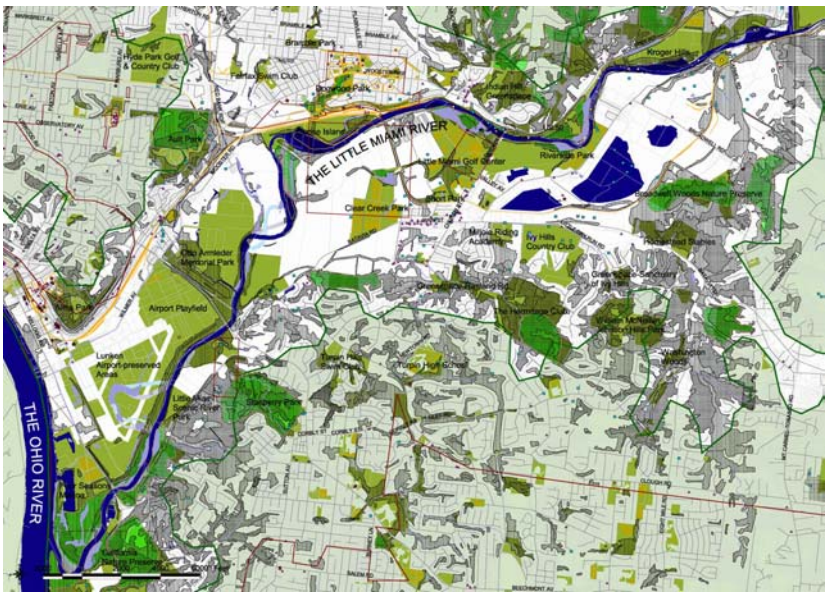






OVERVIEW

THE LITTLE MIAMI RIVER VALLEY IS AN AREA RICH WITH NATURAL RESOURCES, RURAL CHARACTER AND SCENIC BEAUTY. IT IS IMPORTANT THAT THE SPIRIT OF THE VALLEY IS PROTECTED AS THE AREA UNDERGOES CHANGE IN THE FUTURE.



PRIORITIES

VISUAL ATTRACTION

HILLSIDES

HISTORIC BUILDINGS

VALUES +/-

SEASONAL VARIATIONS
BUFFER EFFECT
SIGHT LINES/VISTAS

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

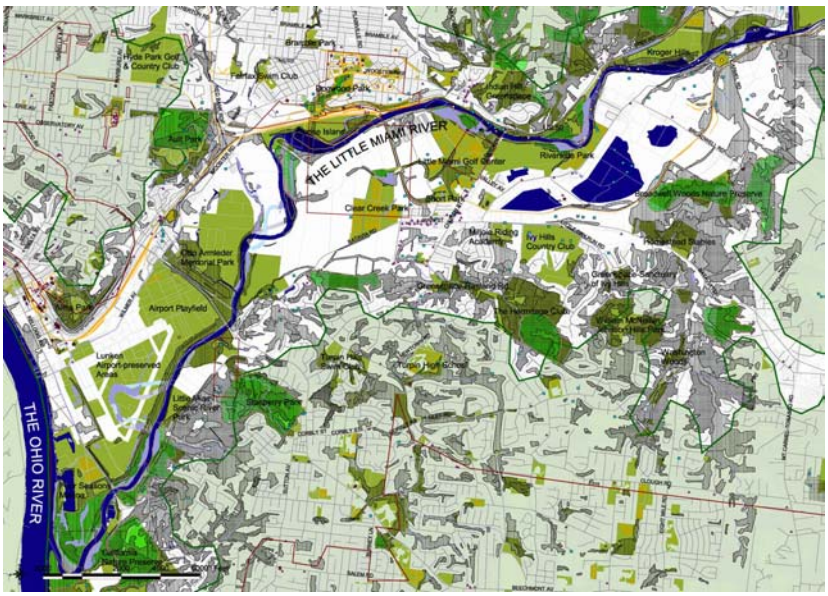
GEOLOGY





OVERVIEW

SOUTHWEST OHIO'S GEOLOGY IS PRIMARILY COMPRISED OF SHALE, LIMESTONE, KOPE FORMATIONS AND GLACIAL DEPOSITS. THE GEOLOGIC MAKE-UP OF THE LITTLE MIAMI RIVER VALLEY IS THE UNDERLYING FOUNDATION OF VARIOUS NATURAL RESOURCES THOUGHOUT THE AREA.



PRIORITIES

FLOOD PLAIN | **MARIEMONT BLUFFS** | **KOPE SLOPES / HILLSIDES**

VALUES +/-

FLOOD STORAGE
HABITAT
VISUAL UNIQUE/INTERESTING
AQUIFER (GRAVEL/SAND DEPOSITS)
MINERAL RESOURCES

Chapter 6.5
8 Resource Value Groups

COMMITTEE PRIORITIES – RESOURCES VALUES GROUPS

Agriculture: preserve access and minimize disruption to agricultural land while creating soil erosion & stream bank buffers to protect important water resources and restore habitat.

Communities & neighborhoods: accommodate economic development, enhance safety and livability in nearby communities; create a network of pedestrian and bike links to connect recreation and residential areas; use green space to enhance community identity and buffer commercial development and transportation corridors.

Geology: protect regionally significant hillsides and floodplain areas.

Historical & Cultural Resources: identify and preserve important historic & archaeological sites and carefully link with park and greenspace to enhance educational value of these resources.

Recreation, Greenspace & Parkland: expand recreation opportunities, parkland and greenspace areas by incorporating wetlands, stream buffers, wooded hillsides and creating a network of walking and biking trails to link neighborhoods, parks, and public open space.

Scenery and Landscape: create multi-purpose buffers around expanding commercial and industrial areas; conserve viewsheds and key vistas; enhance buffer of Little Miami River.

Water Quality: implement wetland and stream restoration techniques to filter stormwater and improve water quality, restore important habitat and enhance aquifer recharge.

Wildlife, Fish and Habitat: re-establish important wildlife corridors and habitat through open space, greenways, park areas, buffers and wetland/stream restoration.

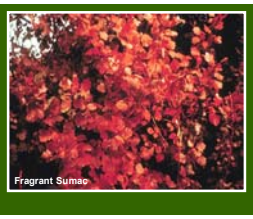
Chapter 6.6
Recommended Native Plants

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

XERIC RIDGE TOPS & HILLSIDES


Wild Rose


Ninebark


Fragrant Sumac


Sour Gum


Bitternut Hickory

Native Plant Species

Bitternut Hickory (Carya cordiformis)
Mockernut Hickory (Carya tomentosa)
Sour Gum (Nyssa sylvatica)
Ninebark (Physocarpus opulifolius)
Eastern Red Cedar (Juniperus virginiana)
Honeylocust (Gleditsia triacanthos var. inermis)
Chinkapin Oak (Quercus muehlenbergii)
Black Oak (Quercus velutina)
Fragrant Sumac (Rhus aromatica)
Wild Rose (Rosa carolina)


Eastern Red Cedar (Juniperus virginiana)
A pioneer plant, Eastern Red Cedar is the only needled evergreen native to southwestern Ohio. It will tolerate poor soil conditions and readily grows on dry hillsides, helping to stabilize erosion.


Fragrant Sumac (Rhus aromatica)
Fragrant Sumac is a spreading plant that provides fast cover and helps prevent erosion. It is very tolerant of dry, infertile soils and develops orange-red-purple fall foliage

WETLANDS

Native Plant Species

Black Willow (Salix nigra)
Buttonbush (Cephalanthus occidentalis)
Black Chokeberry (Aronia melanocarpa)
Marsh Marigold (Caltha palustris)
Northern Blue Flag (Iris versicolor)


Buttonbush


Northern Blue Flag


Black Willow


Buttonbush is a dominant wetland shrub in swamps throughout much of Ohio.


Marsh marigold blooms in the spring and is often an indicator of ground water inputs or permanently saturated soils.


Marsh Marigold


Black Willow is Ohio's most common native willow. It can be found growing along most any river as long as there is sufficient light.

EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

FLOOD-PLAIN ALLUVIAL & WATER MARGINS


Green Ash


Palm Sedge


Swamp White Oak


Sycamore


Winterberry

Native Plant Species

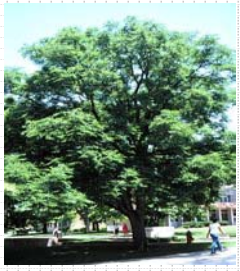
Pawpaw (Asimina triloba)
Summersweet (Clethra alnifolia)
Winterberry (Ilex verticillata)
Kentucky Coffeetree (Gymnocladus dioicus)
Red Maple (Acer rubrum)
Sycamore (Platanus occidentalis)
River Birch (Betula nigra)
White Ash (Fraxinus americana)
Green Ash (Fraxinus pennsylvanica)
Sweetgum (Liquidambar styraciflua)
Tuliptree (Liriodendron tulipifera)
White Oak (Quercus alba)
Swamp White Oak (Quercus bicolor)
American Hornbeam (Carpinus caroliniana)
Silky Dogwood (Cornus amomum)
Turtlehead (Chelone glabra)
Spotted Joe-Pye Weed (Eupatorium maculatum)
Cardinal Flower (Lobelia cardinalis)
Beebalm (Monarda didyma)
Obedient Plant (Physostegia virginiana)
Lady Fern (Athyrium filix-femina)
Palm Sedge (Carex muskingumensis)
Soft Rush (Juncus effusus)
Prairie Cord-grass (Spartina pectinata)


Along with hummingbirds, flowers of beebalm attract bees, butterflies, and other nectar-loving insects.


Sweetgum is a common pioneer in secondary succession. It's a large forest tree with brilliant fall foliage.


Asimina triloba is the only species of a large family of tropical plants to inhabit our cool-temperate zone. Pawpaw is frequently observed growing in groves in shady wooded areas. Its fruit is eaten by man and animal alike.


More northern in range than any other oak, Swamp White Oak can be found in throughout Ohio in bottomlands and swamps.


While its native habitat is along water margins and in flood plains, Kentucky Coffeetree is adaptable to a wide range of conditions including drought and the city environment. Its seeds were used by early settlers as a coffee substitute, hence, the common name.


A plant that's well adapted to wet conditions, Winterberry produces red fruits that look outstanding, especially when framed by snow.


Sycamore is the largest of all eastern trees in girth. One of the largest recorded sycamores had a trunk circumference of 48 feet.

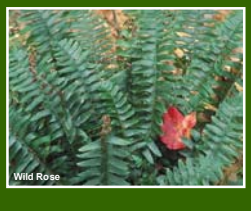
EASTERN CORRIDOR GREEN INFRASTRUCTURE PLAN

MESIC RAVINES


Hackberry


Blackhaw Viburnum


Sweetfern


Wild Rose


Wild Rose

Native Plant Species

Shagbark Hickory (Carya ovata)
Common Persimmon (Diospyros virginiana)
Hackberry (Celtis occidentalis)
Tuliptree (Liriodendron tulipifera)
Bigleaf Magnolia (Magnolia macrophylla)
Fringe Tree (Chionanthus virginicus)
Dogwood (Cornus florida)
Witchhazel (Hamamelis virginiana)
Fragrant Sumac (Rhus aromatica)
Blackhaw Viburnum (Viburnum prunifolium)
Sweetfern (Comptonia peregrina)
Spicebush (Lindera benzoin)
Christmas Fern (Polystichum acrostichoides)


All parts of Spicebush are aromatic. It thrives in full shade but adapts to a variety of exposures and types of soils.


An extremely adaptable and tough tree, Hackberry will grow in virtually any soil type, in wet or dry areas. It can withstand adverse conditions such as wind, full sun, dry soils and air pollution.

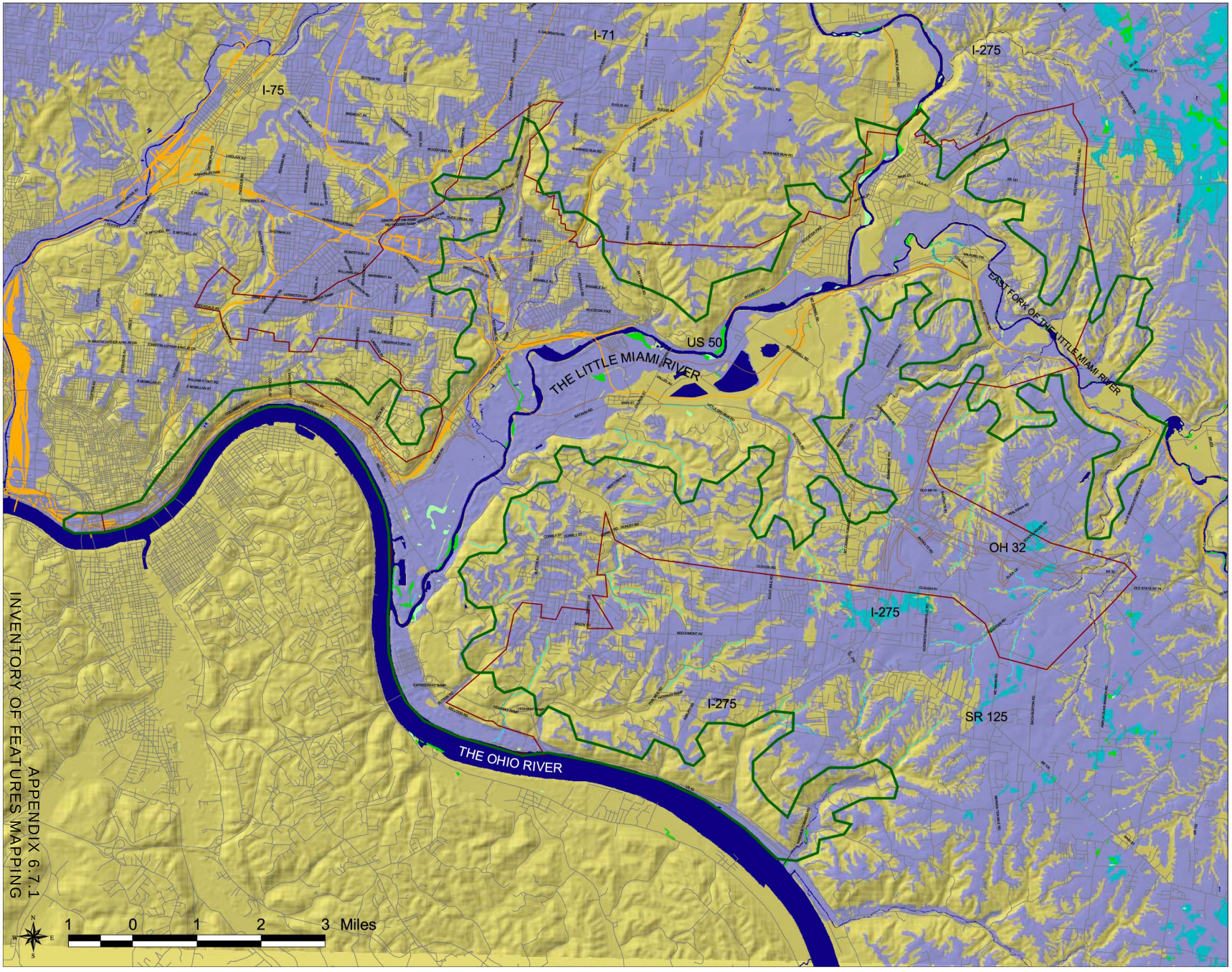

The Tuliptree is one of the tallest eastern American hardwood species, reaching heights of 200' with a trunk diameter of 8-10'. Of ancient lineage, Tuliptree was one of the largest trees in the primeval forest.


The Fringe Tree is very adaptable and air pollution tolerant, with fragrant white flowers in late spring and dark blue fruits in late summer that are relished by birds.


The Blackhaw Viburnum occurs throughout Ohio more than any other Viburnum. Along with its display of attractive spring flowers and fall foliage, it also produces palatable fruits that have been enjoyed by birds and humans alike.

Chapter 6.7
Inventory of Features Mapping

EASTERN CORRIDOR GREEN INFRASTRUCTURE CONCEPT MASTER PLAN



WETLANDS INVENTORY & HYDRIC SOILS ANALYSIS

LOCATION MAP

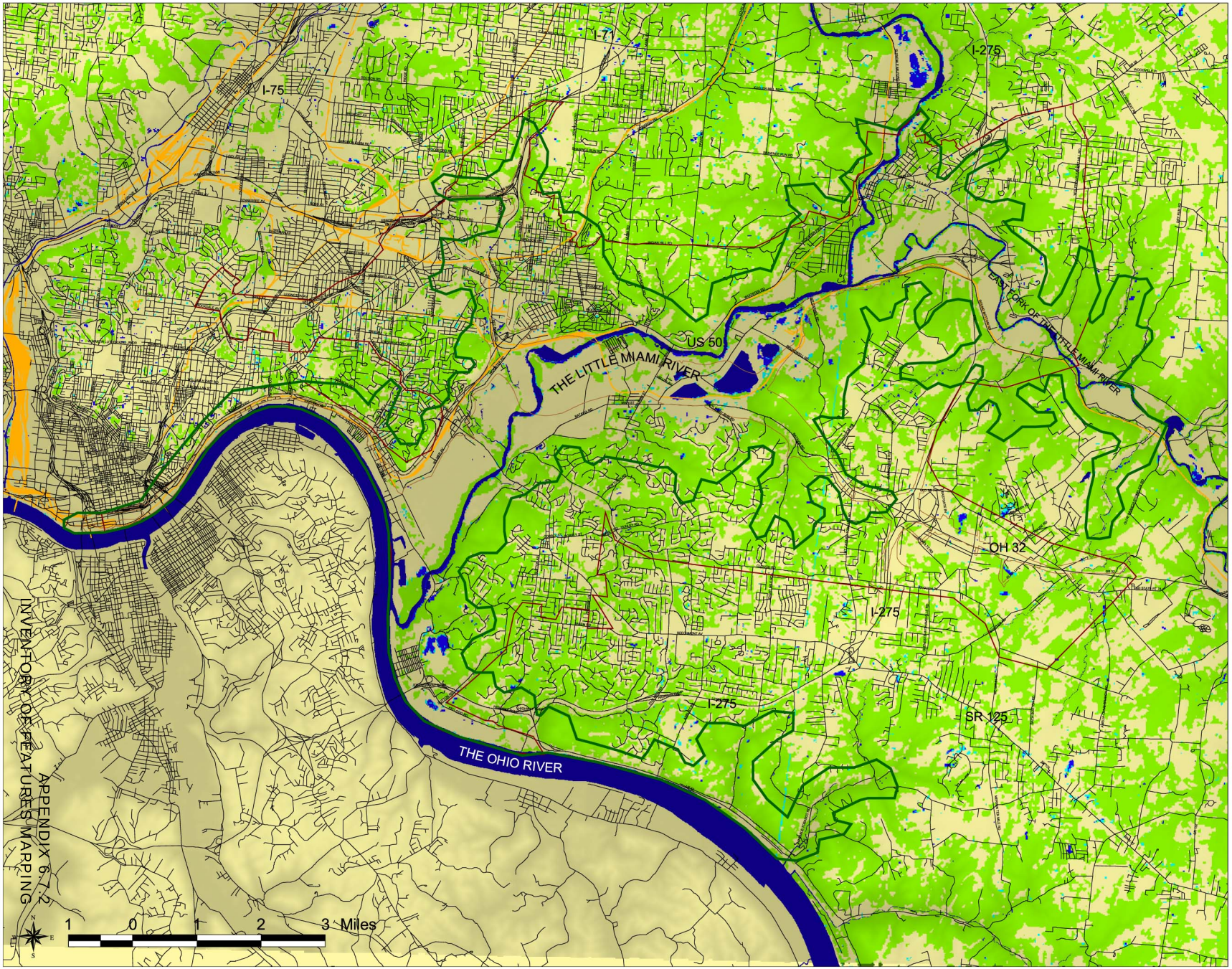
- EC Greenspace Study Area
- Eastern Corridor Study Area
- Detailed Study Area
- Primary Roads
- Railway Lines

Wetlands
- SCRUB-SHRUB
- FORESTED
- EMERGENT
- Rivers & Streams

Hydric Soils
- Non-Hydric Soils
- Hydric Inclusions
- Hydric Soils

PLANNING
URBAN DESIGN
LAND PLANNING
LANDSCAPE ARCHITECTURE
MEISNER ASSOCIATES LAND VISION
3048 Madison Road
Cincinnati
Ohio 45209
(513) 321-2796
Fax (513) 321-3605
BALKE AMERICAN
GRAY & PAPE

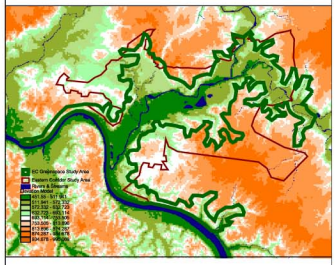
EASTERN CORRIDOR GREEN INFRASTRUCTURE CONCEPT MASTER PLAN



LAND COVER AREA ANALYSIS

LOCATION MAP

ELEVATION MAP



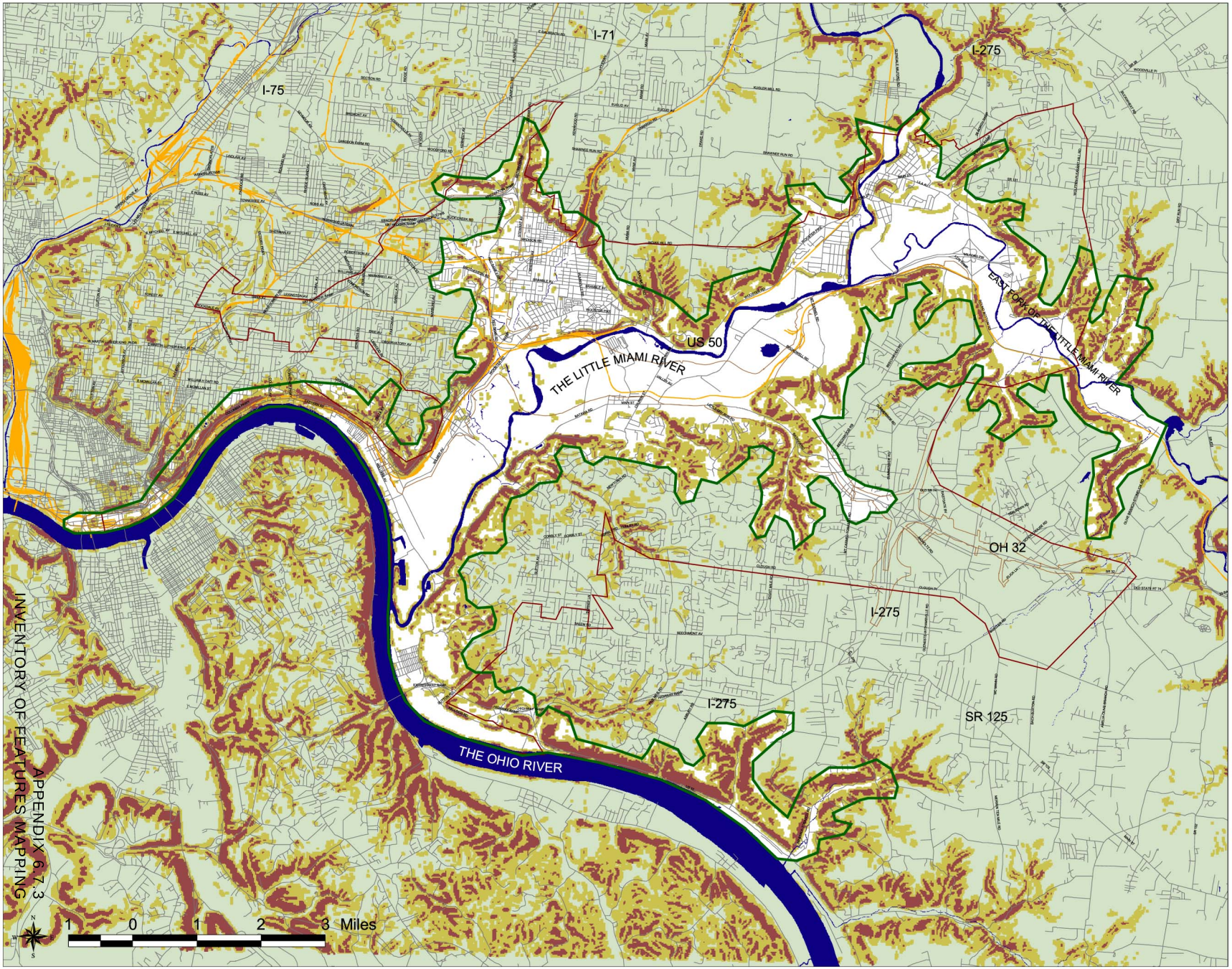
- EC Greenspace Study Area
- Eastern Corridor Study Area
- Detailed Study Area
- Primary Roads
- Railway Lines
- Rivers & Streams

Land Cover

- Urban / Agriculture
- Wooded Area
- Wetlands
- Water

PLANNING
URBAN DESIGN
LAND PLANNING
LANDSCAPE ARCHITECTURE
MEISNER ASSOCIATES
LAND VISION
3048 Madison Road
Cincinnati
Ohio 45209
(513) 321-2796
Fax (513) 321-3605
BALKE AMERICAN
GRAY & PAPE

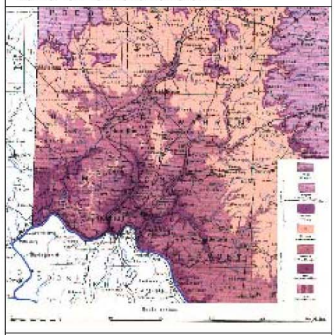
EASTERN CORRIDOR GREEN INFRASTRUCTURE CONCEPT MASTER PLAN



TOPOGRAPHIC ELEVATION & SLOPE ANALYSIS

LOCATION MAP

1920 GEOLOGIC SURVEY



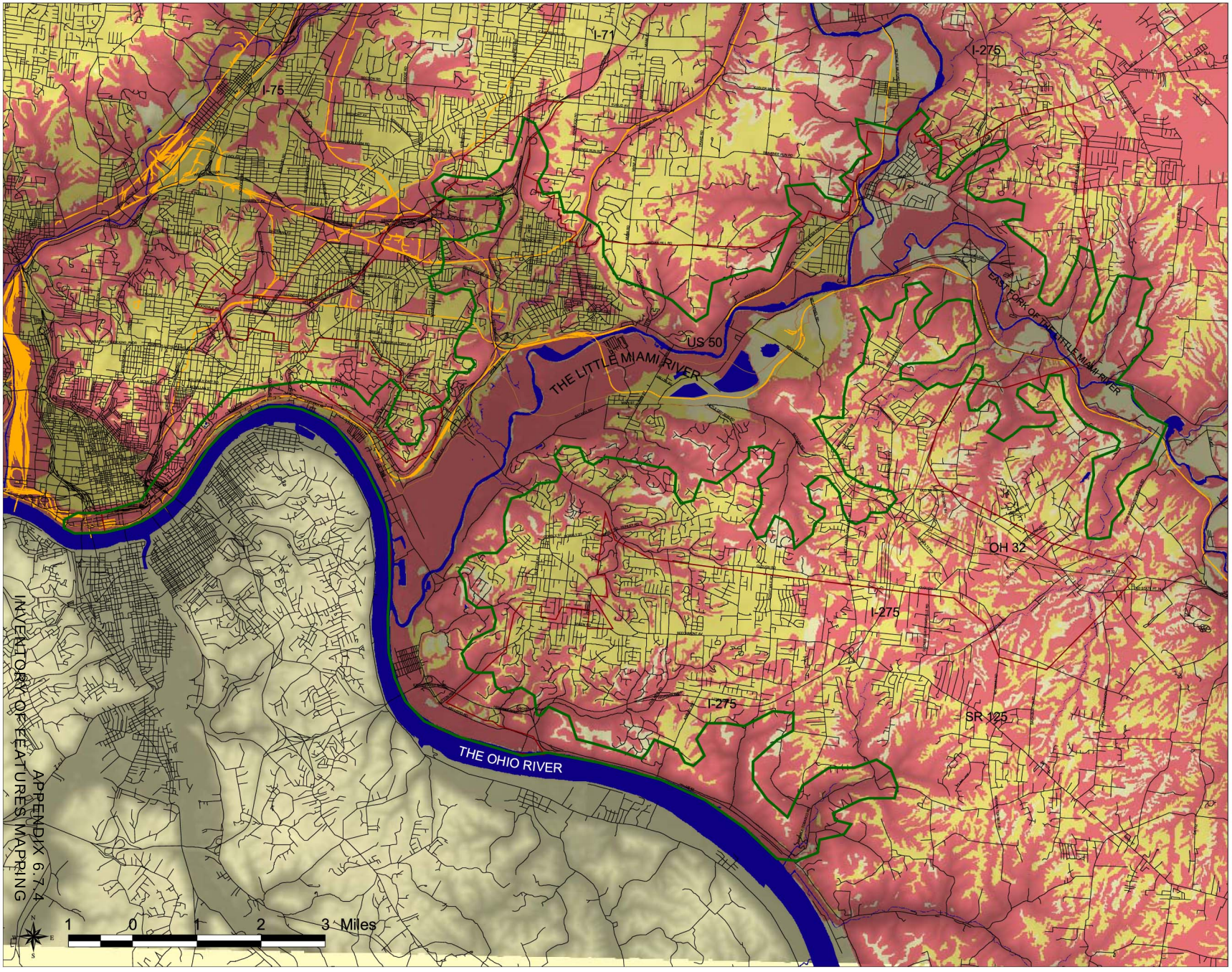
- EC Greenspace Study Area
- Eastern Corridor Study Area
- Detailed Study Area
- Primary Roads
- Railway Lines
- Rivers & Streams

Topographical Slope

- 0-10 Percent
- 10-15 Percent
- 15-40 Percent

PLANNING
URBAN DESIGN
LAND PLANNING
LANDSCAPE ARCHITECTURE
MEISNER ASSOCIATES LAND VISION
3048 Madison Road
Cincinnati
Ohio 45209
(513) 321-2796
Fax (513) 321-3605
BALKE AMERICAN
GRAY & PAPE

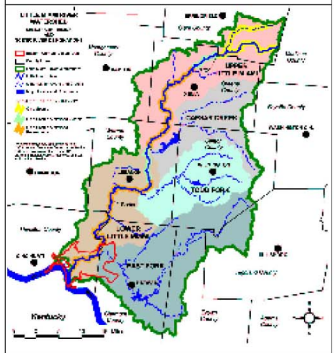
EASTERN CORRIDOR GREEN INFRASTRUCTURE CONCEPT MASTER PLAN



SOIL LIMITATIONS ANALYSIS

LOCATION MAP

LITTLE MIAMI WATERSHED



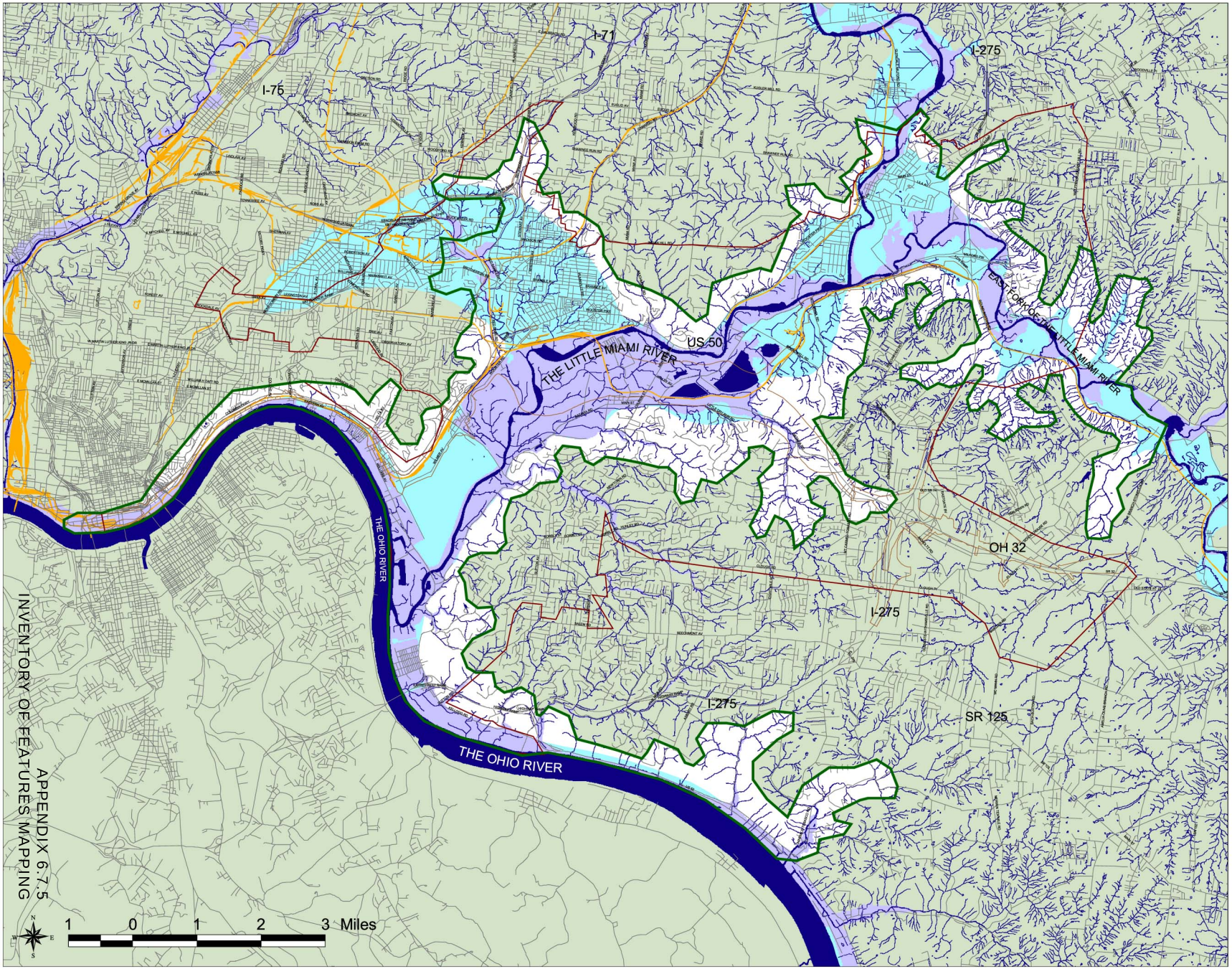
- EC Greenspace Study Area
- Eastern Corridor Study Area
- Detailed Study Area
- Primary Roads
- Railway Lines
- Rivers & Streams

Soil Limitations

- Slight Limitations
- Moderate Limitations
- Severe Limitations

PLANNING
URBAN DESIGN
LAND PLANNING
LANDSCAPE ARCHITECTURE
MEISNER ASSOCIATES
LAND VISION
3043 Madison Road
Cincinnati
Ohio 45209
(513) 321-2796
Fax (513) 321-3605
BALKE AMERICAN
GRAY & PAPE

EASTERN CORRIDOR GREEN INFRASTRUCTURE CONCEPT MASTER PLAN

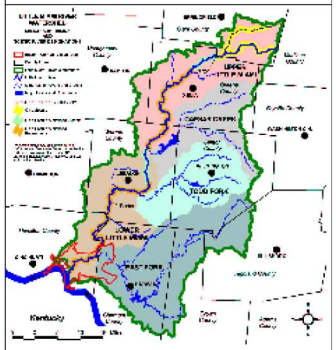


APPENDIX 6.7.5
INVENTORY OF FEATURES MAPPING

100 YEAR FLOOD ZONE & GREAT MIAMI AQUIFER SYSTEM

LOCATION MAP

LITTLE MIAMI WATERSHED



EC Greenspace Study Area
Eastern Corridor Study Area
Detailed Study Area
Primary Roads
Railway Lines
Rivers & Streams
Flood Zone
100 Year Floodplain
Great Miami Sole Source Aquifer

PLANNING
URBAN DESIGN
LAND PLANNING
LANDSCAPE ARCHITECTURE
MEISNER ASSOCIATES
LAND VISION
3048 Madison Road
Cincinnati
Ohio 45209
(513) 321-2796
Fax (513) 321-3605
BALKE AMERICAN
GRAY & PAPE

Chapter 6.8
Preliminary Mitigation Opportunities in the Transportation Investment Area

Eastern Corridor Multi-Modal Projects
Hamilton and Clermont Counties, Ohio

TECHNICAL MEMORANDUM:
PRELIMINARY MITIGATION OPPORTUNITIES IN THE EASTERN CORRIDOR TRANSPORTATION INVESTMENT AREA

NOTE: THE FOLLOWING IS SUMMARY INFORMATION FROM THE TECHNICAL MEMORANDUM, AND DRAFT ONLY, PENDING COMMITTEE REVIEW AND COMPLETION OF THE FINAL REPORT

For:

Eastern Corridor Green Infrastructure Planning Committee, Ohio-Kentucky-Indiana Regional Council of Governments, and Hamilton County Transportation Improvement District

By:

Balke American
Meisner and Associates

February 2005

PRELIMINARY MITIGATION OPPORTUNITIES IN THE EASTERN CORRIDOR TRANSPORTATION INVESTMENT AREA

The Preliminary Mitigation Opportunities Inventory is being developed in conjunction with the Eastern Corridor Green Infrastructure Concept Master Plan, and is a continuation of planning efforts established by the Eastern Corridor Major Investment Study (MIS) 2000, the Eastern Corridor Land Use Vision Plan (LUVP) 2002, and the Eastern Corridor Multi-Modal Transportation Projects Tier 1 PE/EIS work.

The information presented in this inventory has two key applications: first, to guide refinement of alternatives, preliminary design work and mitigation development during Tier II of the Eastern Corridor study and, secondly, to be used by local communities in guiding future land use planning, and public and private infrastructure and community development.

This inventory includes the following information:

Maps:

- **Green Infrastructure Plan in the Transportation Investment Area**
- **Preliminary Mitigation Opportunities in the Transportation Investment Area**
- **Green Infrastructure Plan Components & Lower East Fork Watershed Components in the Transportation Investment Area**

Please note that the attached information and conceptual mapping are preliminary only, and will be refined, expanded and further developed as the green infrastructure plan and the Eastern Corridor project progress.

1. POTENTIAL WETLAND RESTORATION/CREATION OPPORTUNITIES

Potential wetland restoration/creation opportunities were identified from evaluating secondary source information and reconnaissance field survey. Criteria used for identifying a potential mitigation site included: presence of existing wetland features, the potential of these features for recovery from disturbances, and potential suitable hydrology, soils and flora. Each of the areas identified has the opportunity for creating new wetland and/or restoring or enhancing existing features based on preliminary information only. Detailed hydrological and other studies are needed to determine actual wetland mitigation suitability.

Area #1 - Potential wetland restoration/creation opportunity Area #1 is located on land east of Wooster Pike and west of the Little Miami River. Area #1 is approximately 168 acres in size and encompasses land area primarily in private ownership. Observed land uses were construction demolition landfill, agricultural row crop, and fallow agricultural fields on the east side of Area #1, and public park land, new field and aggregate mining on the west side. The soybean rowcrop portion of Area #1, however, appeared to have been planted for soil stabilization instead of harvesting, as the current crop appeared to have been in the field for a number of years. Several of the fallow fields were borrow areas for soil used as daily cover for a construction/demolition landfill operation on the site (this activity was observed during several visits to the property). These borrow pits were also prepared in such a way that also indicated they were to become additional landfill cells.

Soils within Area #1 are predominantly Jules silt loam which is described in the Hamilton County Soil Survey as being occasionally flooded. Stonelick fine sandy loam, which is described as frequently flooded, occurs in a small portion of Area #1 towards the southeast end in the bend of the Little Miami River. Jules silt loam is identified as hydric soil on the National and State Lists of Hydric Soils. It is not, however, listed as hydric within Hamilton County. Stonelick soil is not identified as hydric on the National, State or local county lists.

In the middle of Area #1, and extending northwest in an old slough of the Little Miami River adjacent to the landfill operation, is a moderate to high quality wetland that is approximately 5.4 acres in size. Another wetland, a moderate quality feature approximately 7.2 acres in size, occurs to the north of Area #1 in a young to intermediate-aged woodland. Location of a wetland restoration/creation area adjacent to these existing wetland features would not only serve to provide the creation of new wetland area, but could potentially enhance functions of these existing features by providing additional buffer and protection area.

Potential hydrological inputs to Area #1 include observed overland flow from the northeast through the agricultural row crop and fallow fields. Another and more significant source of hydrological input was noted during field reconnaissance to the area conducted during 2004. A substantial amount of flowing water (10-12 inches, flowing) was observed entering Area #1 from the existing 5.4 acre moderate to high quality wetland, described above. Water was entering Area #1 from this existing wetland, and then spreading out to submerge most of the south end of Area #1, south of the landfill. Water marks on trees and bushes, eight to ten feet high, were also observed at the mouth of this existing wetland, indicating the potential for significant hydrological input to Area #1. Additional hydrological input was noted on the west side of Area #1 as evidenced by debris flow lines and depressed and bent vegetation. A significant amount of water appeared to have flowed from the northwest, overland, spreading out over the entire western portion of Area #1 leaving occasional deep pools (>3 feet deep) scattered throughout. Occasional hydrological input could also come from flood water of the Little Miami River as the entire area is located within 100-year floodplain.

Area #2 - Potential wetland restoration/creation opportunity Area #2 is located along the channel of Clear Creek on land area north of SR 32 and west of Debolt Street, west of the Village of Newtown. Area #2 is approximately 142 acres in size and encompasses land area that is primarily in private ownership. Observed land uses were agricultural soybean row crop, sod fields, and public park land. Soils within Area #2 are comprised of Jules silt loam on the north side of Clear Creek and Huntington silt loam on the south side of Clear Creek. Both soils are listed by the Hamilton County Soil Survey as being occasionally flooded. Jules silt loam is identified as hydric on the National and State Lists of Hydric Soils. It is not, however, listed as hydric within Hamilton County. Huntington soil is not identified as hydric on the National, State or local county lists.

Located in Area #2, within and immediately adjacent to the Clear Creek channel, are a number of lower to moderate quality wetland features ranging in size from approximately 0.005 acre to nearly five acres in size. Location of a wetland restoration/creation area adjacent to these existing wetlands would not only serve to provide the creation of new wetland area but could potentially enhance functions of these existing wetlands by providing additional buffer and protection area.

Hydrological inputs to Area #2 include observed overland flow from the north through the existing sod fields. Another and more significant source of hydrological input was noted during field reconnaissance of the area conducted during 2004. A substantial amount of flowing water (3-6 feet deep, flowing) was observed entering Area #2 from the Clear Creek channel. Previous investigations indicated that the channel may dry out almost completely during drier times of year. However, during wetter years, or wetter times of year, the channel generally fills and spreads water through all of Area #2, and some of the adjacent sod fields. Field investigations in 2004 also indicated that beaver activity had altered the flow of Clear Creek rerouting flow at the east end of Area #2. A significant amount of water (24-36 inches, flowing) was observed spreading-out and flowing through the woodlot identified in Tier I studies as Woodland J. Woodland J had been previously mapped as a National Wetland Inventory (NWI) feature but did not meet minimum wetland criteria for soils and hydrology during previous field investigations. A wetland determination has not yet been performed on this woodland for Tier II studies, however, current conditions indicate that the entire woodlot may have developed into, or may be developing into additional wetland area at this time.

The altered water flow was also observed to have enhanced a moderate quality wetland located towards the west end of Area #2. This wetland was observed to have grown significantly in size since documentation during previous field investigations. The wetland had developed to encompass a significant portion of the surrounding wooded riparian and scrub-shrub habitats. The actual size and development of this wetland feature will be documented in Tier II studies.

Occasional hydrological input could also come from flood water of the Little Miami River as the entire area is located within 100-year floodplain.

Portions of Area #2 may be underlain with drainage tile and irrigation piping related to sod field agricultural activities. These will require sealing and/or removal to assure adequate water retention within any wetland restoration/creation feature constructed in this area.

Area #3 - Potential wetland restoration/creation opportunity Area #3 is located on land area situated south of the City of Mariemont between the Little Miami River and the Norfolk Southern Railroad. Area #3 is approximately 47.6 acres in size and encompasses land area that is in public ownership. Observed land use was primarily unmoved new field with a small portion being used as vegetable gardens by residents of the City of Mariemont.

Soils within Area #3 are comprised entirely of Jules silt loam which is described in the Hamilton County Soil Survey as being occasionally flooded. Jules silt loam is identified as hydric on the National and State Lists of Hydric Soils, but is not listed as hydric within Hamilton County.

Contained within Area #3, within an old slough of the Little Miami River, is a moderate quality wetland that is approximately 1.2 acres in size. Location of a wetland restoration/creation area adjacent to this existing wetland would not only serve to provide the creation of new wetland area but could potentially enhance functions of this existing wetland by providing additional buffer and protection area.

Potential hydrological inputs to Area #3 include the possibility of redirecting flow from an unnamed Little Miami River Tributary that abuts Area #3 along the west side. This tributary was observed during field reconnaissance of the area to possess a substantial amount of flow even during drier summer and fall months. Another potential water source occurs in the old slough that contains the Category 2 wetland described above. Flowing water was not observed in this slough at the time of the field reconnaissance, however, evidence of flow (debris flow lines, bent vegetation) was observed that indicated the presence of a potential source of hydrology. Occasional hydrological input could also come from flood water of the Little Miami River as the entire area is located within 100-year floodplain.

Area #4 - Potential wetland restoration/creation opportunity Area #4 is located on land area situated west of Mount Carmel Road and north of Broadwell Road. Area #4 is approximately 100 acres in size and encompasses land area that is in private ownership. Observed land uses at the site was topsoil mining and mulching. The site was previously covered almost entirely by intermediate to mature-aged woodland, and contained a seven acre wetland, towards the north end. However, all of the trees were removed and mulched, and the wetland dredged and removed as part of the topsoil mining and mulching operations at the site. Area #4 also previously contained an NWI mapped wetland located towards its south end that was also removed as part of the activities at the site.

Soils within Area #4 are primarily comprised of materials designated as Gravel Pits in the Hamilton County Soil Survey. Two other soil types occur in Area #4: Eldean urban land complex and Martinsville silt loam. None of these soils are listed as hydric on the National, State or local county lists.

Hydrological inputs to Area #4 include observed flow from the south through an unnamed USGS intermittent blueline stream that used to enter the site from just east of Broadwell Road at Mount Carmel Road. The stream used to flow north through the former woodland and wetlands to the Little Miami River. At this time, it is unclear if any portion of this feature still exists. Area #4 is not in the 100-year floodplain of the Little Miami River.

2. RIPARIAN RESTORATION OPPORTUNITIES

Riparian restoration opportunities were identified through a combination of walk-over surveys, conditions described from individual accounts and suspected conditions as surmised from project aerial photographs. These sites along the Little Miami River and tributaries are locations that have been disturbed by riparian clearing from adjacent development and/or exhibit some form of streambank modification. Opportunity exists to restore these areas to natural conditions. Potential restoration opportunities (not included below) also exist along the East Fork and tributaries, as identified by studies being conducted in the Lower East Fork Watershed by Clermont County and others.

Site A - Site A occurs along the western bank of the Little Miami River and is approximately 6,680 feet in length. Site A stretches across land area that is primarily in private ownership. Observed land uses were construction demolition landfill, agricultural row crop, fallow agricultural fields and public park land. Site A has eroding and artificially shaped banks, and an incomplete scrubby to completely absent riparian corridor.

Landfill operation activities appear to have encroached upon, and lead to the complete removal in some areas of the riparian corridor along Site A. Where riparian corridor does still exist, it is comprised of mostly invasive non-native bush honey suckle and autumn olive shrubs. Attempts have been made along vast reaches of the eroding bank to stabilize it with the placement of numerous tires, and large chunks of asphalt and concrete. Most of the stream bank south of Horseshoe Bend has been artificially shaped to prevent the inflow of high water from the Little Miami River to the landfill area. Eroding banks throughout Site A have lead to moderate to severe siltation of the riverbed substrate from Horseshoe Bend southward. The most severe bank erosion is occurring at the Horseshoe Bend area of Site A where riparian corridor is completely absent and the Little Miami River bends sharply southward.

As observed during field reconnaissance conducted along Site A, restoration opportunities exist for reforestation and replacement of the riparian corridor with native tree and shrub species, removal of the modified portions of the artificially shaped bank and stabilization of eroding bank areas in order to reduce and prevent substrate siltation of the riverbed.

Site B - Site B occurs along the northern bank of the Little Miami River just west of Newtown Road, south of US 50/Wooster Pike. Site B is approximately 2,670 feet in length and stretches across land that is primarily in public ownership. Current land uses, as determined from aerial photography, include a mixture of public park lands and commercial and institutional establishments.

As indicated on aerial photography of the area, mitigation opportunities may exist along Site B for reforestation and replacement of the riparian corridor with native tree and shrub species, removal of modified portions of artificially shaped bank and stabilization of eroding bank areas in order to reduce and prevent substrate siltation of the riverbed.

Site C - Site C occurs along the southern bank of the Little Miami River just west of Round Bottom Road, adjacent to Riverside Park, north of the Village of Newtown. Site C is approximately 2,390 feet in length and is located on land this is in public ownership. Observed land use is public park land owned by Anderson Township. Park officials have indicated that, presently, flow from the Little Miami River is eroding the southern bank of the river into park property, and that bank stabilization is needed to correct this situation.

As indicated by park officials and surmised from aerial photography of the area, restoration opportunities exist along Site C for stabilization of eroding bank areas in order to reduce and prevent substrate siltation of the riverbed. Opportunities also potentially exist for the reforestation and replacement of the riparian corridor with native tree and shrub species and removal of modified portions of any artificially shaped bank.

Site D - Site D occurs along the northern bank of the Little Miami River and is located just to the north of Site C, described above. Site D is approximately 3,230 feet in length and stretches across land that is primarily in public ownership. Current land use, as determined from aerial photography, is primarily public park or open public land, with one to two single family residences occurring at either end of the site.

As indicated on aerial photography of the area, restoration opportunities may exist along Site D for reforestation and replacement of the riparian corridor with native tree and shrub species, removal of modified portions of artificially shaped bank and stabilization of eroding bank areas in order to reduce and prevent substrate siltation of the riverbed.

Site E - Site E occurs along both banks of Clear Creek from the Little Miami Golf Course to the Little Miami River. Site E is approximately 10,500 feet in length and stretches across land that is primarily in private ownership. Observed land uses were agricultural soybean row crop, sod fields, and public park land.

The site has been encroached upon by agricultural activities which have lead to the complete to nearly complete removal of the riparian corridor in several areas. Site E also has undergone quite extensive artificial bank shaping and modification. Unstable eroding banks also occur in many places and have lead to severe siltation of the stream substrate materials at these locations. Additionally, a number of quality wetlands are known to exist within this portion of Clear Creek, and any riparian restoration activities at this portion of Clear Creek would have to take into consideration the existence and quality of these wetland features. However, coordination of restoration activities with wetland mitigation/creation opportunities in this area could potentially produce the greatest beneficial effect for both types of features.

Site F - Site F occurs along both banks of Dry Run from Newtown Road to just north of SR 32. Site F is approximately 9,570 feet in length and stretches nearly equidistant across land that is both in public and private ownership. Observed land uses along Site F are the Indian Valley Golf Course, abandoned quarry land and Norfolk Southern Railroad right-of-way.

The site has been encroached upon by golf maintenance and aggregate mining activities. This has lead to the complete to nearly complete removal of riparian corridor in many areas. Both banks of Site F have also been artificially shaped and highly modified in a number of areas. Severe erosion, and moderate to severe siltation of the streambed substrate have also occurred.

As observed during field reconnaissance conducted along Site F, restoration opportunities exist for reforestation and replacement of the riparian corridor with native tree and shrub species, removal of modified portions of artificially shaped banks and stabilization of eroding bank areas in order to reduce and prevent substrate siltation of the streambed.

Site G - Site G occurs along both banks of Dry Run located immediately adjacent to, and south of SR 32, from just west of Hickory Creek Drive to Eight Mile Road. Site G is approximately 2,640 feet in length and occurs along land that is in private ownership. Observed land uses included single family residences, agricultural pastureland and a few vacant parcels.

As indicated on aerial photography of the area, restoration opportunities may exist along Site G for reforestation and replacement of the riparian corridor with native tree and shrub species, removal of modified portions of artificially shaped banks and stabilization of eroding bank areas in order to reduce and prevent substrate siltation of the steam bed.

Site H - Site H occurs along both banks of McCullough Run located immediately adjacent to, and south of SR 32, from River Hills Drive to just south of Hills Lane off of Little Dry Run Road. Site H is approximately 7,810 feet in length and occurs along land that is primarily in private ownership. Observed land uses were generally commercial establishments and golf course/country club property along SR 32, and single family residences and a few vacant parcels along Little Dry Run Road.

As observed during field reconnaissance conducted along portions of Site H, and indicated on aerial photography of the area, restoration opportunities exist for reforestation and replacement of the riparian corridor with native tree and shrub species, removal of modified portions of artificially shaped banks and stabilization of eroding bank areas in order to reduce and prevent substrate siltation of the streambed.

Site I - Site I occurs along both banks of an unnamed non-USGS stream flowing from just west of Mount Carmel Road to a large pond on abandoned quarry property. Site I is approximately 1,100 feet in length and occurs on land that is in private ownership. Observed land uses were vacant land area to the east of the Norfolk Southern Railroad behind the Didier Taylor Corporation building that had been grubbed and cleared to bare soil, and abandoned quarry property to the west of the Norfolk Southern Railroad.

As observed during field reconnaissance conducted along Site I, and indicated on aerial photography of the area, restoration opportunities exist for reforestation and replacement of the riparian corridor with native tree and shrub species, removal of modified portions of artificially shaped banks and stabilization of eroding bank areas in order to reduce and prevent substrate siltation of the streambed.

3. RIPARIAN PRESERVATION/ENHANCEMENT OPPORTUNITIES

Except for the restoration opportunity areas described above, a narrow wooded riparian corridor currently exists along much of the Little Miami River. Mitigation opportunities are possible for these areas through preservation and/or enhancement efforts such as development of preservation easements, planting with native species, and expansion of the riparian corridor width. A 120-foot riparian buffer on either side of the river channel is a preliminary goal, based on guidelines received from the Ohio Department of Natural Resources Scenic Rivers Division during agency coordination conducted during Eastern Corridor Tier I work. Potential preservation opportunities also exist along the East Fork and tributaries, as identified by studies being conducted in the Lower East Fork Watershed by Clermont County and others.

4. POTENTIAL CULTURAL RESOURCES MITIGATION OPPORTUNITIES

The Hahn Field Archaeological District is located north of SR 32 on the northwest side of Newtown. The rectangular-shaped district covers approximately 690 acres. The district was listed on the National Register in 1974 due to the inclusion of a number of burials and a range of activity areas dating to the late Woodland and Fort Ancient cultural periods. The district is multi-component containing a number of concentration areas. This site once contained at least two mounds that are no longer present. Past excavations and information from local landowners have indicated possible burial sites and a range of additional features within the district boundaries, although comprehensive studies have not been conducted to determine the actual location, extent and significance of archaeological resources in this area. The Hahn Field Site Cemetery, once located on the floodplain of the Little Miami River, is a previously recorded archaeological site that is part of the archaeological district. Currently, the majority of the area is primarily used for agriculture and recreation activities.

Detailed field investigation is recommended for this area to better identify existing archaeological resources. Once resources are more accurately described, potential mitigation opportunity may include such measures as the establishment of an archaeological education and interpretive center or museum at the site. Field studies, dig site methodology, artifact retrieval, preservation and curation could be incorporated into the educational aspect of the interpretive center and viewed by the public.

5. LOCAL CONSERVATION PROJECTS AND PROGRAMS IN THE AREA

The following two tables summarize opportunities for linking with local conservation projects in the area, including: local agencies and private groups with conservation initiatives in place or underway in the green infrastructure planning area, and other conservation groups and community contacts.

The Eastern Corridor

SUMMARY OF CONSERVATION PROJECTS AND FACILITIES IN THE GREEN INFRASTRUCTURE PLANNING AREA

GROUP	EMPHASIS	PROJECT OR FACILITY IN GIC AREA	POTENTIAL MITIGATION OPPORTUNITY(S)	CONTACT
Anderson Park District	Planning, acquiring and managing parkland in Anderson Township for active recreational use	Clear Creek Park, Riverside Park, Johnson Hills Park, Juilfs Park, Beech Acres Park	• Johnson Park – currently undeveloped • Beech Acres Park – planned expansion/improvement • Other parks – assist with planned improvements • Mitigation site acquisition and/or management • Bike trail connections (Riverside & Juilfs Parks) • Assist with conservation easements	Anderson Park District 8249 Clough Pike Cincinnati, Ohio 45244 513-474-0003
Anderson Township Greenspace Program	Acquiring township greenspace for preservation and protection (no active recreational use)	Various parcels along SR 32	• Mitigation site acquisition and/or management • Greenspace buffers • Assist with conservation easements	Anderson Twp. Gov. Center 7954 Beechmont Ave. Anderson Twp, Ohio 45255 513-474-5560
Anderson Trails Program	Establishing township-wide bicycle and pedestrian networks, linking parks, schools, libraries, etc. with residential areas	Five Mile Shared Use Trail – from Newtown Road south to intersection of State Road and Five Mile Road	• Bike & pedestrian trail connections	Anderson Twp. Gov. Center 7954 Beechmont Ave. Anderson Twp, Ohio 45255 513-474-5560
Cincinnati Parks Department and Cincinnati Recreation Commission	Managing city parks, urban forestry street trees, and select highway greenspaces and gateways	Armleder Little Miami Park, Ault Park, California Woods, Columbia Parkway greenspace, Little Duck Creek Park, Magrish Riverlands Preserve	• Armleder Little Miami Park – currently being developed • Other parks – assist with planned improvements • Mitigation site acquisition and/or management • Assist with conservation easements	Cincinnati Parks Department 950 Eden Park Drive Cincinnati, Ohio 45202 513-352-4080

The Eastern Corridor

SUMMARY OF CONSERVATION PROJECTS AND FACILITIES IN THE GREEN INFRASTRUCTURE PLANNING AREA

GROUP	EMPHASIS	PROJECT OR FACILITY IN GIC AREA	POTENTIAL MITIGATION OPPORTUNITY(S)	CONTACT
Clermont County Soil and Water Conservation District and East Fork Watershed Collaborative	Improving water quality in lower East Fork of the Little Miami	*Restoration of Stream Function and Water Quality Improvements in Tributaries of the lower East Fork LMR* - Section 319(h) Nonpoint Source Program Implementation Grant from OEPA to improve water quality in lower East Fork watershed, with emphasis on Hall Run and Wolfpen Run	• Coordination/expansion of program into Hamilton County for LMR water quality and stream improvements	Clermont Soil and Water Conservation District 1000 Locust Street P.O. Box 549 Owensville, Ohio 45160-0549 513-732-7075
Clermont County Office of Environmental Quality and East Fork Watershed Collaborative	Creating management plans for sub-basins of the East Fork Little Miami watershed	Lower East Fork Watershed Action Plan, Stonelick Creek Watershed Action Plan, Shayler Creek Watershed Action Plan	• Coordination/expansion of this sub-basin program into Hamilton County for LMR water quality and stream improvements	Clermont County Office of Environmental Quality 2379 Clermont Center Drive Batavia, Ohio 45103-2961 513-732-7745
Clermont County Water and Sewer District	Supply and treatment of drinking water and treatment and disposal of wastewater in Clermont County	Proposed Loveland-Miamiville Wastewater Treatment Plant	• Coordination of information for LMR water quality and stream improvements	Wastewater Division 4386 Haskell Lane Batavia, Ohio 45103-2961 513-732-7970
Clermont County Park District	Preserves open space, natural areas and areas of scenic value	Protection of riparian, 100-year floodplain and floodway of East fork through WRRSP grant; property holdings in the lower East Fork	• Identification of willing land owners; hold and manage property for restoration and preservation	Clermont County Park District 2280 US 50 Batavia, OH 45103 513-732-2977
Hamilton County Stormwater District	Addressing NPDES Phase II storm water permit regulations and managing storm water quality on a watershed basis	Hamilton County Storm Water Management Plan for compliance with OEPA NPDES Phase II (MS4) requirements	• Coordinate mitigation plan to fulfill requirements of the county stormwater plan	Hamilton County Stormwater District County Administration Building 138 East Court Street Cincinnati, Ohio 45202 513-946-4254

The Eastern Corridor

SUMMARY OF CONSERVATION PROJECTS AND FACILITIES IN THE GREEN INFRASTRUCTURE PLANNING AREA

GROUP	EMPHASIS	PROJECT OR FACILITY IN GIC AREA	POTENTIAL MITIGATION OPPORTUNITY(S)	CONTACT
Hamilton County Park District	Planning, acquiring and managing parkland in Hamilton County	Little Miami River Scenic Bike/Hike Trail, Kroger Hills (conservation area), Little Miami Golf Center improvements	• Mitigation site acquisition and/or management • Bike trail connections (Little Miami Scenic Trail) • Other parks – assist with planned improvements • Assist with conservation easements	Hamilton County Park District 10245 Winton Road Cincinnati, Ohio 45231 513-728-3555
Hillside Trust	Preserving hillside areas in Hamilton, Clermont and Boone Counties through donation or by conservation easement	Broadwell Preserve (Mt. Carmel Road, Anderson Township); Stern Preserve (Elstun Road, Mt. Washington); Duermit Easements (Lilbur Lane, Anderson Township)	• Mitigation site acquisition and/or management • Hillside buffers • Assist with conservation easements	The Hillside Trust P.O. Box 8607 Alms Park Cincinnati, Ohio 45208-0607 513-321-3886
Land Conservancy of Hamilton County	Preserves land for its natural, recreational, scenic, historic or agricultural value through conservation easements, land donation or other measures	Turner Farm Agricultural Conservation Easement (Indian Hill)	• Assist with conservation easements • Mitigation site acquisition and/or management	The Land Conservancy of Hamilton County 5200 Race road Cincinnati, Ohio 45247 513-574-1849
Little Miami River Incorporated	Protection and preservation of Little Miami Scenic River	Horseshoe Bend Preserve	• Assist with conservation easements • Mitigation site acquisition and/or management	Little Miami River Incorporated 6040 Price Road Milford, Ohio 513-965-9344
Little Miami River Partnership	Assisting local communities in protection, restoration, conservation and preservation of Little Miami River watershed	Watershed management plan for East Fork sub-watershed	• Coordination/expansion of sub-watershed program into Hamilton County for LMR water quality and stream improvements	Little Miami River Partnership 777 Columbus Ave., Suite 5B Lebanon, Ohio 45306 513-695-1187

The Eastern Corridor

SUMMARY OF CONSERVATION PROJECTS AND FACILITIES IN THE GREEN INFRASTRUCTURE PLANNING AREA

GROUP	EMPHASIS	PROJECT OR FACILITY IN GIC AREA	POTENTIAL MITIGATION OPPORTUNITY(S)	CONTACT
Ohio Department of Natural Resources and Ohio Environmental Protection Agency Watershed Planning	Coordinate with local watershed planning activities in the Little Miami River and East Fork Watersheds; specifically work with Little Miami River Partnership and Clermont County	Lower East Fork Watershed Action Plan, Stonelick Creek Watershed Action Plan, Shayler Creek Watershed Action Plan; Watershed management plan for East Fork sub-watershed	• Coordination/expansion of sub-basin program into Hamilton County for LMR water quality and stream improvements	East Fork Little Miami River Watershed Coordinator at 513-732-7075 Little Miami River Partnership at 513-695-1187
Nature Conservancy	Working with communities to protect plants, animals and natural communities	Redbird Hollow (Indian Hill)	• Assist with conservation easements • Mitigation site acquisition and/or management	Nature Conservancy Ohio Field Office 6375 Riverside Drive, Suite 50 Dublin, Ohio 43017 614-717-2770
Valley View Foundation	Preservation and stewardship of greenspace in Milford	Protection of 170 acres of bottom land at the confluence of East Fork and Little Miami River	• Hold and manage property for restoration and protection	Valley View Foundation 5388 South Milford Road Milford, Ohio 45150

The Eastern Corridor

OTHER CONSERVATION GROUPS AND COMMUNITY CONTACTS IN THE GREEN INFRASTRUCTURE PLANNING AREA

GROUP	EMPHASIS	CONTACT
Cincinnati Nature Center	Outdoor education facilities in Goshen and Milford	Cincinnati Nature Center 4949 Tealtown Road, Cincinnati, Ohio 45150 513-831-1711
Cincinnati Preservation Association	Historical preservation easements and land acquisitions within city limits	513-721-4506
Cincinnati Park Board - Greenspace Management Program	Management and maintenance of interstate greenways within city limits	Cincinnati Parks Department 950 Eden Park Drive, Cincinnati, Ohio 45202 513-352-4080
Cincinnati Department of Community Development and Planning – Historic Conservation Office	Historic building / site preservation and management within city limits	Cincinnati Community Development and Planning 805 Central Ave., Suite 700, Cincinnati, OH 45202 513-352-6146
Clermont County Historical Society	Preserve Clermont County historical heritage	Clermont County Historical Society P.O. Box 14, Batavia, Ohio 45103 513-753-8672
Columbia Township	Township government	Columbia Township Administrative Office 5686 Kenwood Road, Cincinnati, Ohio 513-561-6046
Ducks Unlimited – Ohio Chapter	Private lands wetland restoration and Ohio birds	Ducks Unlimited Ohio State Chairman 49 N. Melody Lane, Waterville, Ohio 43566 419-832-6004
Hamilton County Environmental Action Commission	Local coalition that evaluate environmental issues in the OKI region, and develops action strategies for improving the local environment	Tri-State Environmental Resource Center P.O. Box 9854, Cincinnati, Ohio 45209 513-977-8264
Hamilton County Soil and Water Conservation District	Conservation of natural resources within Hamilton County	Hamilton County Soil and Water Conserv. District 29 Triangle Park Drive, Suite 2901 Cincinnati, Ohio 45246-3411 513-772-7645
Indian Hill Historical Society	Preserve historical resources in Village of Indian Hill	Indian Hill Historical Society 8100 Given Road, Cincinnati, Ohio 45243 513-891-1873
Izaak Walton League Cincinnati Chapter	Protect natural resources through grassroots activities; involved in LMR clean-up days	Cincinnati Chapter 544 Branch Hill-Loveland Rd. Loveland, Ohio 45140 ; (513)683-7233

The Eastern Corridor

OTHER CONSERVATION GROUPS AND COMMUNITY CONTACTS IN THE GREEN INFRASTRUCTURE PLANNING AREA

GROUP	EMPHASIS	CONTACT
Mariemont Preservation Foundation	Preservation and education – historical resources in Mariemont	**Mariemont Preservation Foundation** **3919 Plainville Road, Cincinnati, Ohio 45227** **513-272-1166**
Miami Conservancy District	Protection of Great Miami River watershed	Miami Conservancy District 38 E. Monument Ave., Dayton, OH 45402 937-223-1271
Milford Historical Society	Preservation of Promont House and other historical resources in greater Milford area	Greater Milford Area Historical Society 906 Main Street, Milford, Ohio 45150 513-248-0324
Mill Creek Restoration Project	Preservation/restoration of Mill Creek	Mill Creek Restoration 1776 Mentor Avenue, #426, Cinc., Ohio 45212 513-731-8400
ODNR Ohio Water Trails	Statewide study of needed stream access sites	ODNR Division of Watercraft 614-265-6443
Ohio Archaeological Council	Promotes advancement of archaeology in Ohio, including organizing, coordinating and providing financial assistance to archaeological programs	Ohio Archaeological Council PO Box 82012, Columbus OH 43202-0812 937-775-2667
Ohio Wetlands Foundations	Acquire property for the design, construction and maintenance of wetlands in Ohio	The Ohio Wetlands Foundation 729 Creekside Drive, Lancaster, OH 43130 740-654-4016
Oxbow, Inc.	Preserve floodplain wetlands along Great Miami River mouth	Oxbow, Inc. PO Box 43391, Cincinnati, OH 45243 513-851-9835
Rivers Unlimited	Statewide group to protect and restore rovers in Ohio	Rivers Unlimited 515 Wyoming Ave, Cincinnati, OH 45215 513-761-4003
Sierra Club Ohio Chapter Miami Group	Conservation efforts, community outreach and education, political work and outdoor activities	Miami Group 513-841-0111
Terrace Park Historical Society	Preservation and education – historical resources in Terrace Park	Terrace Park Historical Society 417 Fifth Street, Newport KY 41071
Terrace Park	Nature preserve along Little Miami River floodplain	Village of Terrace Park – Nature Preserve 513-831-0970
Wild Ones – Greater Cincinnati Chapter	Promotes use of native plant species	Greater Cincinnati Wild Ones P.O. Box 19789, Cincinnati, OH 4521

6. PRELIMINARY PROTECTION MEASURES WORKSHEETS

Early efforts by the Green Infrastructure Committee initially identified 34 resource issues that were grouped into 14 natural, cultural and community resource priorities. The Committee identified values associated with each of the resource priorities, which were subsequently organized into eight value groups. Six of the eight value groups identified by the Committee correspond to the Outstanding Remarkable Values (ORVs) assigned to the Little Miami River under the state and national scenic rivers program: geology, historic and cultural resources, recreation and parklands, scenic quality, water quality, and fish and wildlife habitat. An additional two value groups were identified for the study area from Committee input including: agriculture and communities and neighborhoods. The preliminary protection measures described below are organized around these eight value groups.

The protection measures worksheets have two key applications: first, to guide refinement of alternatives, preliminary design work and mitigation development during Tier II of the Eastern Corridor study and, secondly, to be used by local jurisdictions in guiding future land use and community planning. Protection measures for each value group were developed so that they could be used for both these “design team” and “local planning” purposes, as indicated on the attached draft worksheets. Protection measures address Committee concerns and expectations, and were developed to be in compliance with various local, state and federal regulations, including mitigation guidelines recommended by ODNR Scenic Rivers and other resource agencies during coordination conducted for the Eastern Corridor Tier 1 work. These measures will be refined, expanded and further developed as the Green Infrastructure Concept Master Plan and the Eastern Corridor project progress.

The Eastern Corridor

Green Infrastructure Planning Committee
AGRICULTURE PROTECTION MEASURES WORKSHEET

Value Group: AGRICULTURE

GIC Resource Priorities: Agriculture; Scenery & Landscape; Cultural Resources; Geology; Aquifer

Possible Protection Measures

A. Eastern Corridor Project Design, Construction and Maintenance

Design:

- **Minimize loss of agricultural land and impacts to agricultural infrastructure:** During project design, take measures to minimize loss of existing agricultural land and impacts to existing infrastructure (irrigation systems, wells, flood soils, etc.), such as: follow existing property lines to the extent possible; minimize construction limits through agricultural areas; provide sufficient access to agricultural remnants (avoid creating landlocked parcels); consider hydrological conditions in food areas to preserve flood deposition of silt on agricultural land; and take measures to avoid, to the extent possible, impacting existing irrigation system and private wells, and mitigate unavoidable impacts.

- **Landscaping:** Incorporate existing agricultural landforms (such as fence lines, tree lines, drainage features) into the project landscaping to the extent practicable, following landscape design, safety and planting requirements outlined in: *ODOT's Landscaping Guidelines in Volume 1 of the Location and Design Manual*. Use native species for tree, shrub and herbaceous plantings as listed in *OSU Bulletin 865, Native Plants of Ohio* (ODOT's approved species list).

- **Environmental mitigation:** During development of compensatory stream and wetland mitigation for the project, take measures to ensure that planted species and other vegetation established on the mitigation site do not interfere with the agricultural community through migration or other invasive means. Include measures in the mitigation plan for avoiding the establishment of noxious plants, develop a long-term maintenance plan for the site that addresses vegetation management/control, and specify what agency or group is responsible for long-term management of the mitigation site. Consider using agricultural preservation easements as buffers to the mitigation site.

Construction:

- **Controlling invasive plants:** To prevent the introduction of and controlling the spread of invasive plants onto adjacent agricultural land, follow guidelines outlined in *FHWA's 1999 Guidance on Invasive Species,* including use of procedures such as: identifying and mapping invasive populations within and adjacent to the project corridor to determine invasive potential; inspecting and cleaning construction equipment; ensuring use of invasive-free seed mixes, mulch and topsoil; and minimizing soil disturbance during construction. Invasive plants in Ohio are identified in *OSU Bulletin 866-98 Identifying Noxious Weeds of Ohio*. Species of key concern to agricultural land include Canada thistle, smartweed, and Johnsongrass.

B. Local Planning and Land Use Strategies

- **Agricultural preservation easements:** Work with agricultural landowners, local park districts and/or other state and local conservation groups to establish agricultural preservation easements.

- **Historic values:** Develop a local program to develop the historical agricultural value of the GIC area, and consider establishing a historical center that may be used for outdoor education and/or to attract tourism.

- **GIC plan:** Plan and coordinate agricultural preservation with other aspects of the GIC plan, including wildlife habitat, recreation, aesthetics, water quality, communities, and history.

The Eastern Corridor

Green Infrastructure Planning Committee
COMMUNITIES PROTECTION MEASURES WORKSHEET

Value Group: COMMUNITIES & NEIGHBORHOODS

GIC Resource Priorities: Communities & Neighborhoods; Agriculture; Cultural Resources; Mineral Resources; Aquifer; Commercial Development

Possible Protection Measures

A. Eastern Corridor Project Design, Construction and Maintenance

Design:

- **Community cohesion:** Locate the transportation corridor and transit hubs to optimize community cohesion and commercial development to the extent practicable, and minimize the displacement of people and businesses. Consider design strategies to reinforce sense of place and enhance property values such as: gateways into historic Newtown and/or the Little Miami River area; roadway landscaping and aesthetics such as placement of special lighting, signage and/or sidewalk design through Newtown; aesthetic noise wall design; and controlled access. Obtain public input through the design phase to assure transportation plans are consistent with community needs and expectations to the extent possible.

- **Bike/pedestrian safety:** Develop a bike facility as part of project design and link it with existing and planned bike paths in the Lunken Airport and Newtown areas. Evaluate designing the facility as a shared use path (bike path located on its own right-of-way) with separation between the shared path and roadways for maximum safety and minimal conflict between bicyclists and motorists. Design the facility following structural and safety specifications outlined in the American Association of State Highway and Transportation Officials' (AASHTO) *1999 Guide for the Development of Bicycle Facilities*, as adopted by ODOT (or ODOT's most current manual for bicycle facility design). Obtain public input as the bike path is being designed to assure plans are consistent with community needs and expectations to the extent possible.

- **Noise abatement:** Conduct noise and vibration studies following requirements outlined by FHWA, FTA and *ODOT Noise Policy and Procedures,* and, where abatement is warranted, develop an aesthetic noise wall design or consider alternative abatement measures such as: alteration of horizontal and vertical alignments; traffic management; creation of a buffer zone; noise insulation (for public-use structures); use of natural barriers such as mounds, trees or shrubs. Obtain public input through the design process to assure noise mitigation is consistent with community needs and expectations to the extent possible.

- **Environmental mitigation:** During development of compensatory stream and wetland mitigation for the project, evaluate how the mitigation site may be used by communities for recreation and/or outdoor education purposes. Consider access to the mitigation site and pedestrian links to adjacent communities. Obtain public input during the design phase and incorporate to the extent practicable.

Construction:

- **Construction-related noise and air quality:** During project construction, develop noise control measures according to *FHWA's Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR 772.19),* such as one or more of the following: develop specifications requiring contractors to adhere to all federal, state and local noise control requirements; specify work hour limits near residences; require equipment mufflers; develop a mechanism for community complaints and response. To minimize air quality impacts during construction, strictly adhere to ODOT's specifications for *Environmental Protection* and *Dust Control (Items 107.19 and 616 of the Construction and Materials Specifications Manual).*

- **Maintenance of traffic:** Develop and implement a maintenance of traffic plan following: *ODOT's Location and Design Manual, Volume 3, Section 1306* and *ODOT's Construction and Materials Specifications Manual, Item 614.* Specify that particular attention be made regarding: maintaining fire protection/police emergency routing; proper signage and adequate safety measures for bike/pedestrian paths adjacent to or crossed by the construction corridor; proper signage and adequate safety/traffic flow for vehicular traffic through the construction corridor.

The Eastern Corridor

Green Infrastructure Planning Committee
COMMUNITIES PROTECTION MEASURES WORKSHEET

Value Group: COMMUNITIES & NEIGHBORHOODS

GIC Resource Priorities: Communities & Neighborhoods; Agriculture; Cultural Resources; Mineral Resources; Aquifer; Commercial Development

Possible Protection Measures

B. Local Planning and Land Use Strategies

- **Pedestrian-friendly links:** Evaluate creating pedestrian-friendly links to commercial development, recreational facilities and other public use areas, and develop a mechanism that provides opportunity to coordinate local planning efforts (municipal, county and township) for continuity and support.

- **Historic values:** Develop a local program to develop the historical components of the GIC area, such as: working with local and state historical groups to identify significant areas or features (such as pre-historic, historic agricultural, individual historic properties and/or communities); developing a historical center based on local significance; evaluating potential new business related to tourism; acquiring historical properties through willing sellers, donations or easement holders; and developing a sense of place linked with a historical base.

- **Commercial development and redevelopment:** Coordinate local planning efforts (municipal, county and township) for commercial development, including mineral extraction, agriculture, and other key resources/businesses in the GIC area. Develop a corridor-level plan that includes: re-developing infill areas, landfills, brownfields, blighted areas, and abandoned surface mined areas to new development, greenspace, wildlife habitat and/or recreational use; creating buffers between commercial/industrial sites and residential areas; and locating commercial/industrial areas above floodplain elevations. Obtain stakeholder input through this planning effort.

- **Update local land use plans:** Update/modify local land use plans, zoning and other applicable ordinances / regulations to be consistent with community and land use priorities identified in the *Eastern Corridor Land Use Vision Plan* adopted by OKI.

- **GIC plan:** Develop community components of the GIC area in conjunction with other aspects of the GIC plan, including wildlife habitat, stream restoration, recreation, agriculture, aesthetics, and history.

The Eastern Corridor

Green Infrastructure Planning Committee
GEOLOGY PROTECTION MEASURES WORKSHEET

Value Group: GEOLOGY

GIC Resource Priorities: Geology; Hillsides; Mineral Resources

Possible Protection Measures

A. Eastern Corridor Project Design, Construction and Maintenance

Design:

- **Identify sensitive geological areas:** Conduct appropriate geological and geomorphological studies following procedures outlined in *ODOT's Specifications for Subsurface Investigations* and *ODOT's Geotechnical Engineering Design Checklists*, including: identification of sensitive geological areas/features such as Kope slopes/hillsides, aquifers, floodplain deposits, historical river meanders, and existing and historical wetlands. Avoid encroachment on significant areas to the extent possible, and develop appropriate design measures for minimizing impacts and addressing problematic areas.

- **Incorporate natural geology into project design:** Incorporate existing natural landforms and features into the project landscaping and viewshed to the extent practicable, such as streambanks along the Little Miami River, Mariemont bluffs, and hillsides along existing SR 32.

- **River crossing:** Design a shared roadway/transit crossing of the Little Miami River configured as a clear span over the stream channel, with no instream piers or permanent modification to the existing natural streambanks (except for potential restoration actions – see mitigation below), and coordinate with ODNR for Scenic Rivers Approval per ORC 1517.16, and other appropriate regulatory agencies.

- **Aquifer protection:** Evaluate aquifer protection strategies such as use of closed drainage systems, lined containment ponds, use of median for containment, signage, and/or other appropriate measures, and conduct agency coordination for compliance with requirements of the federal Safe Water Drinking Act.

- **Environmental mitigation:** During development of stream and wetland mitigation plans for the project, consider the historical geology of the area when locating, configuring and designing the mitigation site. Consider such measures as streambank and/or wetland restoration, enhancing aquifer recharge and quality, and using existing hillsides as buffers.

Construction:

- **Protect sensitive areas:** Map the location of high quality streambanks, hillsides, aquifer and floodplains and other locally important landforms adjacent to the project, and identify them as environmental sensitive features that need to be avoided during construction activities, including borrow and waste site selection and construction staging. Follow *ODOT's Guidelines for Identifying Acceptable Locations for the Disposal of Waste Material and Construction Debris of the Excavation of Borrow Material within ODOT Right-of-Way* for avoiding sensitive areas in the selection of borrow and waste sites.

The Eastern Corridor

Green Infrastructure Planning Committee
GEOLOGY PROTECTION MEASURES WORKSHEET

Value Group: GEOLOGY

GIC Resource Priorities: Geology; Hillsides; Mineral Resources

Possible Protection Measures

B. Local Planning and Land Use Strategies

- **Hillside preservation/restoration:** Develop a local voluntary program for protecting hillsides in the GIC area, and restoring streambanks and other natural features, including identifying options for: coordinating with existing local, state, federal and non-profit preservation efforts; funding programs; establishing preservation corridors through willing sellers, donations or easement holders; designating areas as part of the Little Miami forest preserve per ORC 1501.19.1; and hillside and streambank management.

- **GIC plan:** Plan and coordinate the hillside protection program with other aspects of the GIC plan, including wildlife habitat, recreation, aesthetics, water quality agriculture, communities and history.

- **Hillside/slope protection:** Adhere to *Hamilton County Soil and Water Conservation District's Earthwork Regulations* for protecting sensitive land areas and formations from hazardous erosion, sedimentation and associated problems resulting from construction and development activities in the county (per ORC 307.79); develop zoning changes to limit development on steep slopes.

- **Restore gravel pits and brownfield areas:** Coordinate local planning efforts (municipal, county and township) for commercial development, including mineral extraction, agriculture, and other key resources/businesses in the GIC area. Develop a plan for restoring gravel pits, and re-developing infill areas, brownfields, and other blighted areas into new development, greenspace, wildlife habitat and/or recreational use. Obtain stakeholder input through this planning effort.

The Eastern Corridor

Green Infrastructure Planning Committee
HISTORIC PROTECTION MEASURES WORKSHEET

Value Group: HISTORIC & CULTURAL RESOURCES

GIC Resource Priorities: Scenery & Landscape; Cultural Resources; Geology; Agriculture

Possible Protection Measures

A. Eastern Corridor Project Design, Construction and Maintenance

Design:

- **Determine significant historic resources and minimize impacts:** Conduct all required historic and archaeological field studies for compliance with Section 106 of the Historic Preservation Act, Section 4(f) of the Federal Transportation Act, and related statutes, including evaluation of avoidance and minimization of significant historic sites. Coordinate with appropriate federal and state resource agencies and obtain public input.

- **Environmental mitigation:** Evaluate developing project mitigation that combines stream, wetland, and cultural resources mitigation efforts as one plan. Evaluate how the mitigation site may be used by communities for recreation, historic education and/or outdoor education purposes. Consider access to the mitigation site and pedestrian links to adjacent communities. Obtain public input during the design phase and incorporate to the extent practicable.

Construction:

- **Environmental sensitive areas:** Map the location of cultural resources adjacent to the project area, and identify them as environmental sensitive features that need to be avoided during construction, including borrow and waste site selection and construction staging activities.

B. Local Planning and Land Use Strategies

- **Local historic program:** Create a local program to develop the historical components of the GIC area, such as: working with local and state historical groups to identify significant areas or features (such as pre-historic, historic agricultural, individual historic properties and/or communities); developing a historical center based on local significance; evaluating potential new business related to tourism; acquiring historical properties through willing sellers, donations or easement holders; and developing a sense of place linked with a historical base; encourage access to cultural sites by hiking and biking trails and interpretive signage.

- **Resource preservation:** Preserve archaeological sites as part of existing and new greenspaces including wetlands, stream corridors, wooded hillsides, and parks and recreational areas.

- **GIC plan:** Plan and coordinate the historic program with other aspects of the GIC plan, including wildlife habitat, recreation, aesthetics, agriculture, water quality, and communities.

The Eastern Corridor

Green Infrastructure Planning Committee
RECREATION PROTECTION MEASURES WORKSHEET

Value Group: PARKLANDS, GREENSPACE AND RECREATION

GIC Resource Priorities: Parklands, Greenspace & Recreation; Streams & Rivers; Scenery & Landscape; Communities & Neighborhoods

Possible Protection Measures

A. Eastern Corridor Project Design, Construction and Maintenance

- **Create a bicycle link:** Develop a bike facility through the Little Miami River bottom as part of project design for link with existing and planned bike facilities in the Lunken Airport and Newtown areas.
- **Bike facility design:** Design the bike facility following structural and safety specifications outlined in the American Association of State Highway and Transportation Officials' (AASHTO) *1999 Guide for the Development of Bicycle Facilities*, as adopted by ODOT (or ODOT's most current manual for bicycle facility design).
- **Shared use facility separated from roadway:** Evaluate designing the facility as a shared use path (bike path located on its own right-of-way) with separation between the shared path and roadways for safety.
- **River crossing:** Design a shared roadway/transit crossing of the Little Miami River configured as a clear span over the stream channel, with no instream piers to obstruct canoeists. During construction, place navigational markings in the river to alert canoeists and other users that construction activities are occurring in the area.
- **Environmental mitigation:** During development of compensatory stream and wetland mitigation for the project, mitigate impacts to parks, consider proximity to existing recreational areas, and/or create new recreational opportunities, such as including in the mitigation design one or more of the following: replace parkland and/or greenspace lost due to construction of the project; construct bike/pedestrian paths within the mitigation site with links to existing facilities; place benches, viewing areas or other structures for wildlife observation, photography or outdoor education; create new canoe access point along the Little Miami River; create scenic vistas; and/or develop opportunity for other passive recreational uses.

B. Local Planning and Land Use Strategies

- **Coordinate local efforts:** Develop a mechanism that provides opportunity to coordinate all of the different local municipal, township, county, state, and federal recreation plans in order to organize and implement recreation and greenspace development at a corridor or watershed level.
- **New parks and preserves:** Develop a local voluntary program for acquiring new parks and greenspace, including identifying options for: coordinating with existing local, state, federal and non-profit greenspace efforts; funding programs; acquisition through willing sellers, donations or easement holders; designating areas as part of the Little Miami forest preserve per ORC 1501.19.1; and recreational use management.
- **Zoning:** Develop zoning or other ordinances to limit development and access along Little Miami River and other environmental sensitive areas, except for specified recreational uses.
- **New recreational opportunities:** Evaluate local support for creating new recreational opportunities in the area and develop an implementation plan; new recreational opportunities may include providing additional canoe access points along the Little Miami River, creating hunting/fishing areas and/or creating an outdoor education/historical center.
- **GIC plan:** Plan and link existing and new recreational areas and opportunities with other aspects of the GIC plan, including wildlife habitat, stream restoration, aesthetics, agriculture, communities and history.

The Eastern Corridor

Green Infrastructure Planning Committee
VISUAL PROTECTION MEASURES WORKSHEET

Value Group: SCENIC QUALITY

GIC Resource Priorities: Scenery & Landscape; Communities & Neighborhoods; Stream & Rivers; Hillsides; Agriculture

Possible Protection Measures

A. Eastern Corridor Project Design, Construction and Maintenance

- **Design an aesthetic river crossing and transportation corridor:** Design a shared roadway/transit crossing of the Little Miami River configured as a clear span over the stream channel, and develop an aesthetic bridge and roadway design following procedures outlined in *ODOT's Aesthetic Design Guidelines.* Consider a gateway or scenic type design with appropriate patterns, color, lighting, buffer affects, and signing, and develop continuity between these features. For example, consider designing the roadway as a divided corridor with a natural median, develop horizontal and vertical alignments to fit in harmony with existing landforms, and/or create a gateway appearance for approach into the historic Newtown area or Little Miami River bottom area. As needed, conduct a visual impact assessment following *FHWA's Visual Impact Assessment for Highway Projects, Publication No. FHWA-HI-88-054*. Include resource agency requirements and obtain public input on the aesthetic components of bridge and roadway design.

- **Noise and retaining walls:** Where noise or retaining walls are needed, develop an aesthetic design consistent with the overall transportation corridor design. Possible strategies include steps or terraces between walls where appropriate; use of a stone or other textured pattern; use of vegetation plantings to blend walls into the landscape; and use of an earth mound or other natural barrier in lieu of a wall. Obtain public input on the aesthetic components of wall design.

- **Landscaping:** Incorporate existing natural landforms and features into the project landscaping to the extent practicable, and follow landscape design, safety and planting requirements outlined in: *ODOT's Landscaping Guidelines in Volume 1 of the Location and Design Manual*. Use native species for tree, shrub and herbaceous plantings as listed in *OSU Bulletin 865, Native Plants of Ohio* (ODOT's approved species list). Include resource agency requirements for landscaping as needed, and obtain public input on the aesthetic components of the landscaping plan.

- **Environmental mitigation:** During development of compensatory stream and wetland mitigation for the project, consider visual aesthetics of the overall transportation corridor plan to the extent practicable when locating, configuring and designing the mitigation site. Coordinate any recreational opportunities included in the design of the mitigation site (such as bike/pedestrian paths, wildlife observing, photography, etc) with visual aesthetics developed for the roadway.

B. Local Planning and Land Use Strategies

- **Preserve scenic vistas:** Develop a local voluntary program for preserving wooded hillsides, stream corridors, historic centers and other areas/features with scenic value, including identifying options for: coordinating existing local, state, federal and non-profit preservation efforts; funding programs; establishing scenic corridors/vistas through willing sellers, donations or easement holders; designating areas as part of the Little Miami forest preserve per ORC 1501.19.1; and wildlife corridor management.

- **Landfills:** Clean-up and restore abandoned landfills to enhance the scenic quality of the area.

- **Scenic buffers:** Create scenic buffers between commercial/industrial areas and adjacent residences.

- **GIC plan:** Develop aesthetic components of the GIC area in conjunction with other aspects of the GIC plan, including wildlife habitat, stream restoration, recreation, agriculture, communities and history.

The Eastern Corridor

Green Infrastructure Planning Committee
WATER QUALITY PROTECTION MEASURES WORKSHEET

Value Group: WATER QUALITY (STREAMS, AQUIFER AND FLOODPLAIN)

GIC Resource Priorities: Aquifer; Streams & Rivers; Geology; Floodplains; Wetlands

Possible Protection Measures

A. Eastern Corridor Project Design, Construction and Maintenance

Design:

- **River crossing:** Design a shared roadway/transit crossing of the Little Miami River configured as a clear span over the stream channel, with no instream piers, and coordinate with ODNR for Scenic Rivers Approval per ORC 1517.16, and other appropriate regulatory agencies.

- **Aquifer protection:** Evaluate aquifer protection strategies such as use of closed drainage systems, lined containment ponds, use of median for containment, signage, and/or other appropriate measures, and conduct agency coordination for compliance with requirements of the federal Safe Water Drinking Act. During geotechnical investigations, follow *ODOT's Policy for Sealing Geotechnical Exploratory Boreholes (Appendix G of Specifications for Subsurface Investigations).*

- **Environmental mitigation:** Develop stream and wetland mitigation plans during project design, and conduct agency coordination and Section 404/401 permit application for compliance with the Clean Water Act and current provisions of the Ohio Water Pollution Control Act (ORC Chapter 6111), including using measures such as wetland creation and/or restoration, wetland banking, use of 3-sided culverts in streams, use of natural channel design for stream mitigation, and/or other appropriate strategies.

- **Post construction runoff:** Develop post construction storm water management strategies and structural best management practices as outlined in: *ODOT's Location and Design Manual (Volume 2, Sections 1115 and 1116)*, and ODOT's most current *MS4 Storm Water Management Plan,* including evaluating using structures such as vegetated swales and filter strips, infiltration basins or trenches, detention and retention basins, energy dissipaters, constructed wetlands, bioretention cells and/or other appropriate technologies.

- **Floodplains:** Evaluate design measures that incorporate flood control for critical areas in Newtown, and coordinate with the local floodplain coordinator to assure that the project design meets local floodplain requirements.

Construction:

- **Construction runoff:** Develop a Stormwater Pollution Prevention Plan for controlling runoff during the construction period, complete coordination required for ODNR Scenic Rivers Approval per ORC Section 1517.16, and complete coordination and application for an OEPA NPDES Construction Effluent Guidelines Permit as outlined in: *ODOT's Location and Design Manual (Volume 2, Section 1114), ODOT's Supplemental Specifications 832* and *833, ODOT's Construction and Materials Specifications for Temporary Sediment and Erosion Control and Environmental Protection (Items 207 and 107.19),* ODOT's most current *MS4 Storm Water Management Plan*, and following ODNR scenic rivers requirements. Runoff control measures may include one of more of the following: placement of structures such as ditch checks, sediment basins, sediment dams, diversion channels, filter fabric fencing and/or other measures at appropriate locations along the project length; monitoring the effectiveness of these structures during construction; and prohibiting storage of idle equipment, fuels, lubricants or other potentially toxic materials within floodplain areas.

- **Protect environmental sensitive areas:** Map the location of streams, wetlands, aquifers and floodplains adjacent to the project on the project plans, and identify them as environmental sensitive features that need to be avoided during construction. Follow *ODOT's Guidelines for Identifying Acceptable Locations for the Disposal of Waste Material and Construction Debris of the Excavation of Borrow Material within ODOT Right-of-Way* for avoiding sensitive areas when selecting borrow and waste sites.

Operation and Maintenance:

- **Pollution prevention practices:** Strictly adhere to good housekeeping practices for operation and maintenance as outlined in: *ODOT's Maintenance Administration Manual (Volume 2, Sections 209, 405, 406, 502, 603, 604, 606, and 900),* and ODOT's most current *MS4 Storm Water Management Plan*, including use of pollution prevention measures during vegetation mowing, herbicide use, vehicle maintenance, ditch and culvert maintenance, litter control (Adopt-A-Highway Program), winter weather management, salt facility maintenance, and spill response clean-up and disposal.

The Eastern Corridor

Green Infrastructure Planning Committee
WATER QUALITY PROTECTION MEASURES WORKSHEET

Value Group: WATER QUALITY (STREAMS, AQUIFER AND FLOODPLAIN)

GIC Resource Priorities: Aquifer; Streams & Rivers; Geology; Floodplains; Wetlands

Possible Protection Measures

B. Local Planning and Land Use Strategies

- **Stream/wetland bank:** Evaluate developing a stream/wetland bank (private and/or public sponsored) following USCOE guidelines outlined in *Federal Guidance for the Establishment, Use and Operation of Mitigation Banks.*

- **Stream corridor restoration:** Develop a local voluntary program for restoring stream banks and wooded corridors along the Little Miami River and tributaries, including identifying options for: coordinating with existing local, state, federal and non-profit preservation efforts; funding programs; establishing preservation corridors through willing sellers, donations or easement holders; designating areas as part of the Little Miami forest preserve per ORC 1501.19.1; and stream corridor management.

- **GIC plan:** Plan and coordinate the stream corridor restoration program with other aspects of the GIC plan, including wildlife habitat, recreation, aesthetics, agriculture, communities and history.

- **Zoning:** Evaluate developing zoning and/or other local ordinances that outline acceptable activities within a specified width along the Little Miami River and other identified sensitive stream corridors, aquifer zones and wetlands, and coordinate for consistency between the various township, county, and municipal jurisdictions.

- **Update local land use plans:** Update/modify local land use plans, zoning and other applicable ordinances/regulations to be consistent with specific stream corridor, aquifer and floodplain priorities identified in the *Eastern Corridor Land Use Vision Plan* adopted by OKI.

- **Stormwater management:** As part of continued development of the *Hamilton County MS4 Storm Water Management Plan* (adopted March 2003), develop specific mechanisms for protecting the water quality of the Little Miami River, East Fork and other critical riparian corridors and wetland areas at a watershed level; key applicable sections of the Management Plan (as it is currently structured) for protecting these resources basin-wide include: Section 3. Illicit Discharge Detection, including actions related to identification of priority discharge areas, development of a illicit discharge ordinance, development of a Household Septic System Management Plan, and development of a illicit discharge screening program; Section 4. Construction Site Runoff Control, including actions related to development of a Sensitive Areas Protection Plan, ordinance for riparian corridor protection, and a construction site inspection plan; Section 5. Post Construction Runoff Control, including actions related to development of a post construction runoff control ordinance; and Section 6. Pollution Prevention/Housekeeping, including actions related to the development of a district-wide maintenance activities plan.

- **Expand watershed management efforts and stream monitoring:** Expand local efforts for developing a watershed management plan for the Little Miami River to include sub-basins within Hamilton County, including the Little Miami River mainstem, Duck Creek, Dry Run, McCullough Run and Clough Creek (currently, programs and funding are in place for sub-basins from the East Fork to the upper Little Miami watershed only). Include for each sub-basin: an inventory of existing resources; description of physical and biological stream conditions; identification of pollution sources; and recommendations for improving streams, including developing an on-going stream monitoring and assessment program.

- **Landfills:** Clean-up and restore abandoned landfill areas within floodplain and aquifer zones.

The Eastern Corridor

Green Infrastructure Planning Committee
WILDLIFE, FISH AND HABITAT PROTECTION MEASURES WORKSHEET

Value Group: WILDLIFE, FISH AND HABITAT

GIC Resource Priorities: Streams & Rivers; Scenery & Landscape; Agriculture; Geology; Wildlife Threatened / Endangered Species

Possible Protection Measures

A. Eastern Corridor Project Design, Construction and Maintenance

Design:

- **Minimize loss of existing habitat and habitat fragmentation:** During project design, take all practicable measures to minimize impacts to streams and riparian corridors, wetlands, woodland, and other environmental sensitive areas valuable to wildlife, such as one or more of the following: configure the roadway design to fit with the natural landscape to the extent practicable; minimize construction limits in important riparian and woodland areas; use bridge structures for stream and wetland crossings to preserve habitat; use 3-sided box culverts to preserve natural stream bottoms; and coordinate with resource agencies for habitat minimization requirements for regulated features.

- **Wildlife crossings:** Construct underpasses or other structures for wildlife to safely cross transportation corridors.

- **Threatened and endangered species:** During further project development, conduct appropriate studies to determine the occurrence and potential habitat for federal and state-listed species, including Indiana bat, running buffalo clover, bald eagle, and listed plants, mussels and fishes in the Little Miami River drainage; coordinate with resource agencies to develop appropriate avoidance and minimization measures.

- **Landscaping:** Incorporate existing natural landforms and features into the project landscaping to the extent practicable, and follow landscape design, safety and planting requirements outlined in: *ODOT's Landscaping Guidelines in Volume 1 of the Location and Design Manual*. Use native species for tree, shrub and herbaceous plantings as listed in *OSU Bulletin 865, Native Plants of Ohio* (ODOT's approved species list).

- **Environmental mitigation:** During design of stream and wetland mitigation for the project, incorporate suitable shelter and foraging habitat and establish travel corridors for aquatic and terrestrial wildlife. Measures that may be included in the mitigation design include one or more of the following: Stream mitigation – use natural channel design; develop pool and riffle habitat, create natural streambanks using bioengineering techniques; restore natural bottom substrate; develop wooded riparian corridors and buffers; use native species for streambank replanting; link stream mitigation site with existing natural corridors; establish stream corridor preservation easements. Wetland mitigation – create diversity of habitats, such as a mix of open water, emergent and scrub-shrub or forested areas; provide nesting areas for birds or other species; link wetland mitigation site with other natural corridors, streams and buffers; use native species for wetland plantings; discourage establishment of invasive/noxious species.

Construction:

- **Seeding and Mulching:** For areas disturbed during construction that are adjacent to woodlands or natural areas important to wildlife, use an appropriate native grass or native wildflower mix or other native plantings, and follow planting procedures outlined in *ODOT's Construction and Materials Specifications for Seeding and Mulching; Sodding; Trees, Shrubs and Vines; and Environmental Protection (Items 659, 660 661 and 107.19).*

- **Controlling invasive plants:** To prevent the introduction of and controlling the spread of invasive plants (which typically reduce habitat quality for wildlife), follow guidelines outlined in *FHWA's 1999 Guidance on Invasive Species,* including use of procedures such as: identifying and mapping invasive populations within and adjacent to the project corridor to determine invasive potential; inspecting and cleaning construction equipment; ensuring use of invasive-free seed mixes, mulch and topsoil; and minimizing soil disturbance during construction. Invasive plants in Ohio are identified in *OSU Bulletin 866-98 Identifying Noxious Weeds of Ohio*.

Operation and Maintenance:

- **Pollution prevention practices:** Strictly adhere to good housekeeping practices for operation and maintenance as outlined in: *ODOT's Maintenance Administration Manual (Volume 2, Sections 209, 405, 406, 502, 603, 604, 606, and 900)* in order to minimize adverse affects on wildlife, including use of pollution prevention measures during vegetation mowing, herbicide use, vehicle maintenance, ditch and culvert maintenance, litter control, winter weather management, salt facility maintenance, and spill response clean-up and disposal.

The Eastern Corridor

Green Infrastructure Planning Committee
WILDLIFE, FISH AND HABITAT PROTECTION MEASURES WORKSHEET

Value Group: WILDLIFE, FISH AND HABITAT

GIC Resource Priorities: Streams & Rivers; Scenery & Landscape; Agriculture; Geology; Wildlife Threatened / Endangered Species

Possible Protection Measures

B. Local Planning and Land Use Strategies

- **Stream/wetland bank:** Evaluate developing a stream/wetland bank (private and/or public sponsored) following USCOE guidelines outlined in *Federal Guidance for the Establishment, Use and Operation of Mitigation Banks,* and include creation of wildlife habitat and wildlife management as part of the design.

- **Habitat restoration and preservation:** Develop a local voluntary program for restoring and preserving streambanks, wooded corridors, wooded uplands and other greenspace areas, including identifying options for: coordinating with existing local, state, federal and non-profit preservation efforts; funding programs; establishing preservation corridors through willing sellers, donations or easement holders; designating areas as part of the Little Miami forest preserve per ORC 1501.19.1; and wildlife corridor management.

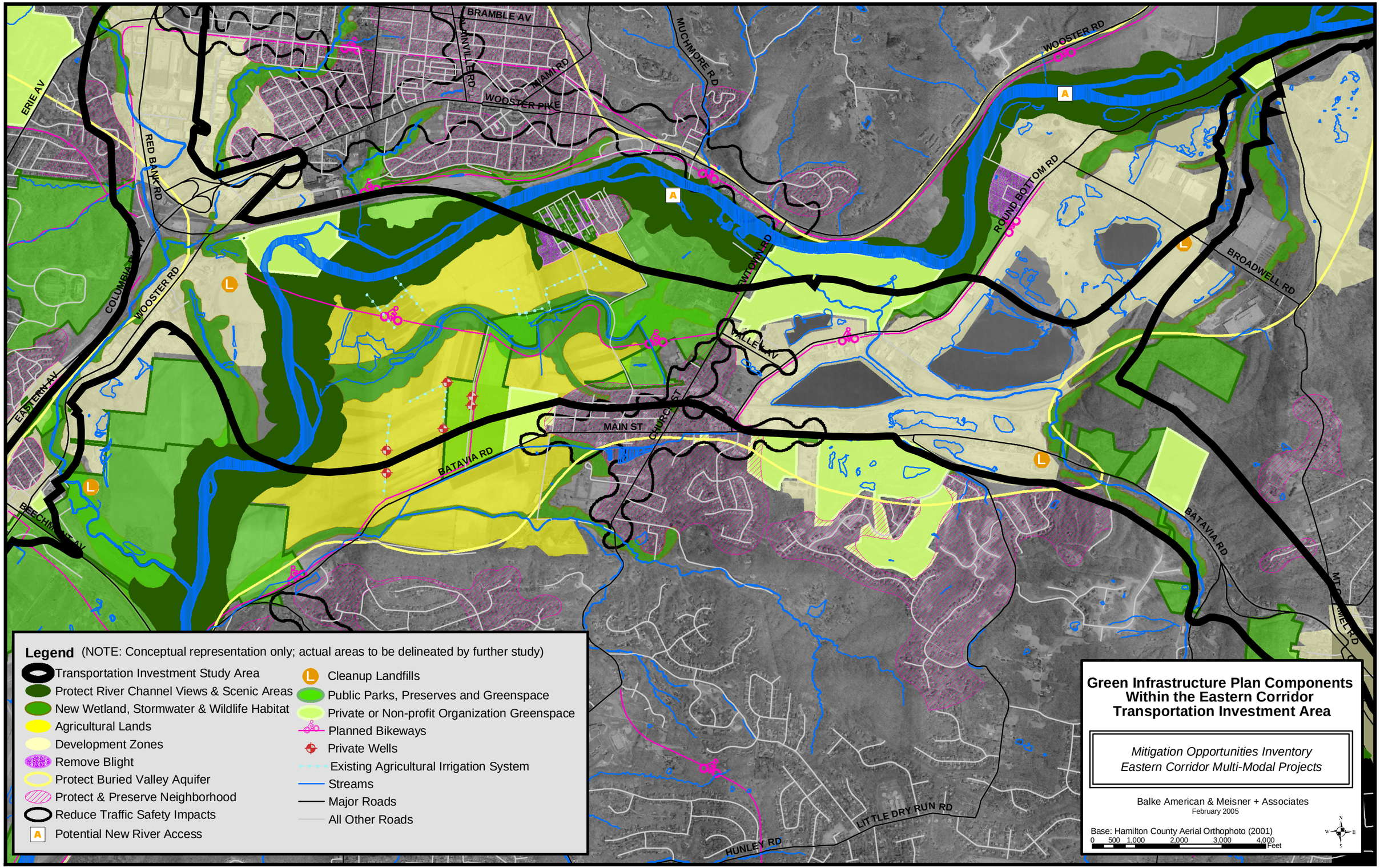
- **GIC plan:** Plan and coordinate the stream corridor restoration program with other aspects of the GIC plan, including wildlife habitat, recreation, aesthetics, agriculture, communities and history.

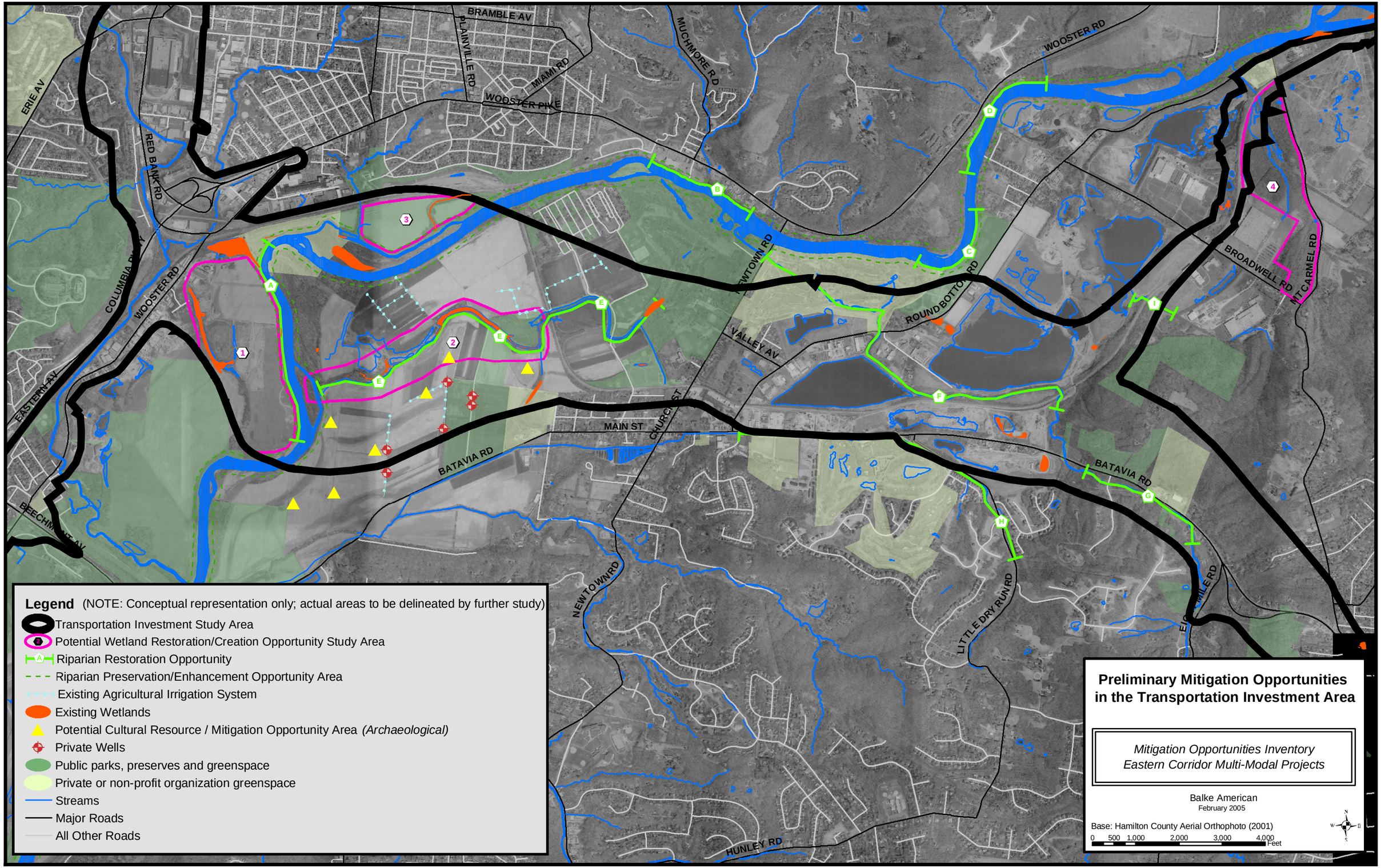
- **Local land use plans:** Update/modify local land use plans to be consistent with specific stream corridor and greenspace priorities identified in the *Eastern Corridor Land Use Vision Plan* adopted by OKI.

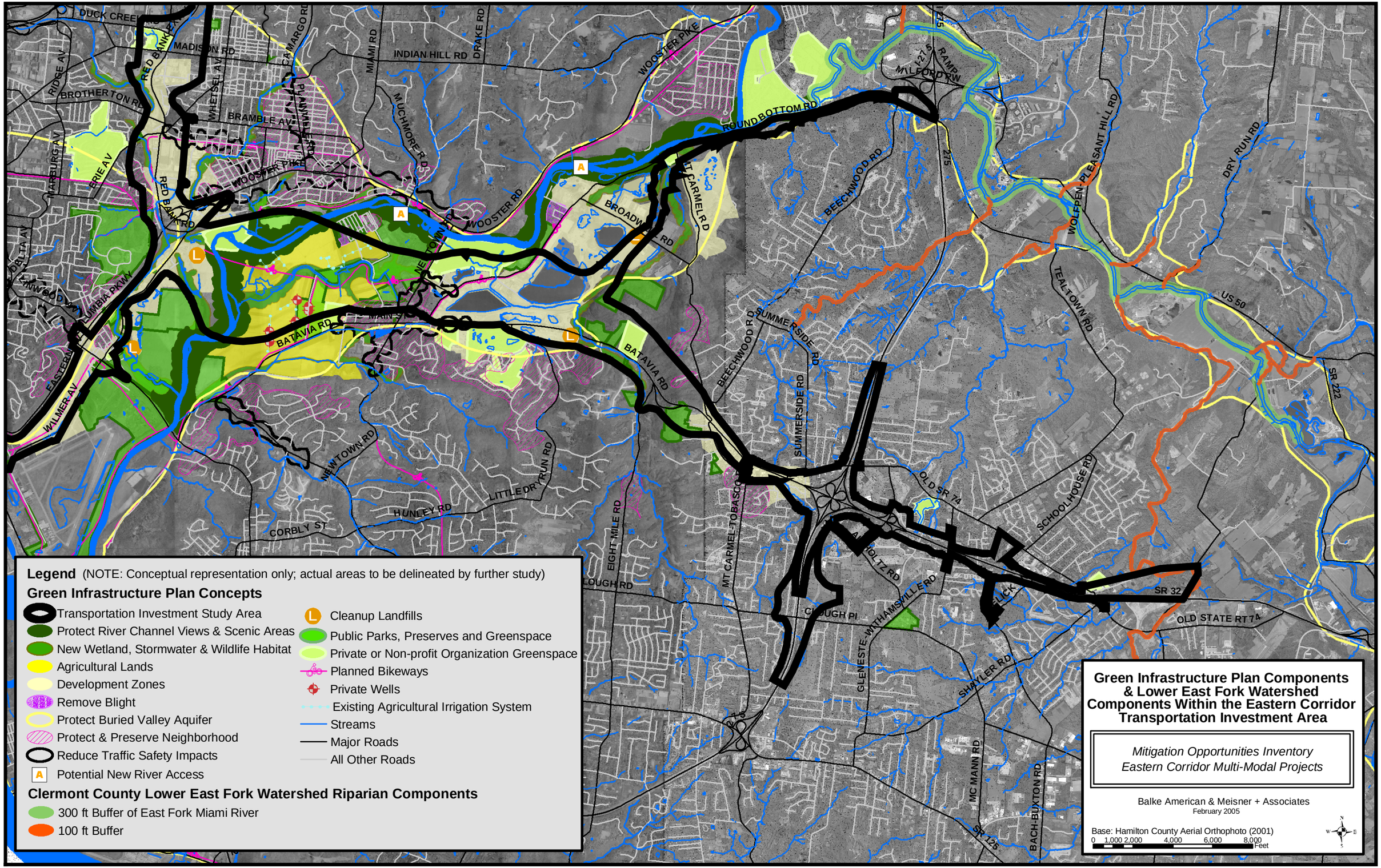
- **Zoning:** Develop zoning or other ordinances to limit development and access along the Little Miami River and other environmental sensitive areas used by wildlife.

7. GIS DATA FOR EXISTING ENVIRONMENTAL FEATURES AND MITIGATION OPPORTUNITIES

A CD is being prepared containing GIS files for inventory and field-verified environmental features, the green infrastructure concept plan, and mitigation opportunities in the green infrastructure planning area for use in further planning efforts.


BRAMBLE AV
MIAMI RD
WOOSTER PIKE
MUCHMORE RD
WOOSTER RD
ERIE AV
RED BANK RD
ROUND BOTTOM RD
BROADWELL RD
COLUMBIA PKWY
WOOSTER RD
EASTERN AV
MAIN ST
CHURCH ST
BATAVIA RD
VALLEY AV
LITTLE DRY RUN RD
HUNLEY RD
Legend (NOTE: Conceptual representation only; actual areas to be delineated by further study)
Transportation Investment Study Area
Protect River Channel Views & Scenic Areas
New Wetland, Stormwater & Wildlife Habitat
Agricultural Lands
Development Zones
Remove Blight
Protect Buried Valley Aquifer
Protect & Preserve Neighborhood
Reduce Traffic Safety Impacts
Potential New River Access
Cleanup Landfills
Public Parks, Preserves and Greenspace
Private or Non-profit Organization Greenspace
Planned Bikeways
Private Wells
Existing Agricultural Irrigation System
Streams
Major Roads
All Other Roads
Green Infrastructure Plan Components Within the Eastern Corridor Transportation Investment Area
Mitigation Opportunities Inventory
Eastern Corridor Multi-Modal Projects
Balke American & Meisner + Associates
February 2005
Base: Hamilton County Aerial Orthophoto (2001)
0 500 1,000 2,000 3,000 4,000 Feet


BRAMBLE AV
PLAINVILLE RD
MIAMI RD
WOOSTER PIKE
MUCHMORE RD
WOOSTER RD
ERIE AV
RED BANK RD
COLUMBIA PKWY
WOOSTER RD
NEWTOWN RD
ROUNDBOTTOM RD
VALLEY AV
BROADWELL RD
MT CARMEL RD
EASTERN AV
MAIN ST
CHURCH ST
BATAVIA RD
BEECHMONT AV
NEWTOWN RD
LITTLE DRY RUN RD
HUNLEY RD
A
B
C
D
E
F
G
H
I
1
2
3
4
Legend (NOTE: Conceptual representation only; actual areas to be delineated by further study)
Transportation Investment Study Area
Potential Wetland Restoration/Creation Opportunity Study Area
Riparian Restoration Opportunity
Riparian Preservation/Enhancement Opportunity Area
Existing Agricultural Irrigation System
Existing Wetlands
Potential Cultural Resource / Mitigation Opportunity Area (Archaeological)
Private Wells
Public parks, preserves and greenspace
Private or non-profit organization greenspace
Streams
Major Roads
All Other Roads
Preliminary Mitigation Opportunities in the Transportation Investment Area
Mitigation Opportunities Inventory
Eastern Corridor Multi-Modal Projects
Balke American
February 2005
Base: Hamilton County Aerial Orthophoto (2001)
0 500 1,000 2,000 3,000 4,000 Feet
N
W
E
S



Legend (NOTE: Conceptual representation only; actual areas to be delineated by further study)

Green Infrastructure Plan Concepts

- Transportation Investment Study Area
- Protect River Channel Views & Scenic Areas
- New Wetland, Stormwater & Wildlife Habitat
- Agricultural Lands
- Development Zones
- Remove Blight
- Protect Buried Valley Aquifer
- Protect & Preserve Neighborhood
- Reduce Traffic Safety Impacts
- A — Potential New River Access
- L — Cleanup Landfills
- Public Parks, Preserves and Greenspace
- Private or Non-profit Organization Greenspace
- Planned Bikeways
- Private Wells
- Existing Agricultural Irrigation System
- Streams
- Major Roads
- All Other Roads

Clermont County Lower East Fork Watershed Riparian Components

- 300 ft Buffer of East Fork Miami River
- 100 ft Buffer

Green Infrastructure Plan Components & Lower East Fork Watershed Components Within the Eastern Corridor Transportation Investment Area

Mitigation Opportunities Inventory
Eastern Corridor Multi-Modal Projects

Balke American & Meisner + Associates
February 2005

Base: Hamilton County Aerial Orthophoto (2001)
0 1,000 2,000 4,000 6,000 8,000 Feet

Chapter 6.9
June 1985 Ohio Scenic Rivers Program
Little Miami River State Scenic River Management Plan

Chapter 6.10
Environmental Stewardship and Streamlining

Chapter 6.11
Outstanding Remarkable Values (ORVs)

Chapter 6.12
“Who Owns Ohio’s Streams?”
ODNR Ohio Stream Management Guide No. 02

Chapter 6.13
“Forested Stream Buffers”
ODNR Ohio Stream Management Guide No. 13

JUNE 1985

OHIO SCENIC RIVERS PROGRAM
LITTLE MIAMI STATE SCENIC RIVER
MANAGEMENT PLAN

I. PURPOSE

To set forth the conservation and preservation of the natural environmental qualities of the Little Miami State Scenic River and its adjacent riparian corridor. Preservation should be accomplished through wise management of natural, historical, cultural and other environmental values for which the river was designated a component of the Federal and State Scenic River Systems.

II. OBJECTIVES

A. Environmental Review and Public Project Approval

Protection of natural, scenic and environmental values of the Little Miami Scenic River should be the major consideration in reviewing and approving or disapproving projects which may have an adverse effect upon the river.

B. Public Access

The Scenic Rivers Program has provided public access to the river and therefore should continue to manage such areas in an effort to preserve the river's natural resources and educate the general public about the importance of river preservation, and the rights of private property owners. When other agencies acquire land for public use adjacent to the Little Miami, they should do so with full knowledge that the river is a designated Scenic River and that preservation of its environmental values is of primary importance.

C. Property Management

The Ohio Department of Natural Resources Scenic Rivers Program should work with property owners, local governments and organizations along the Little Miami Scenic River to encourage protection and proper management of the resources of the river environment.

D. Forest Preserve

The Ohio Department of Natural Resources should promote awareness of the forest preserve, in order to aid in protection of these sensitive lands and to reinforce the Scenic Rivers concept (See ORC 1501.191).

E. Management Hierarchy

The Division of Natural Areas & Preserves Scenic Rivers Program should be established or reinforced as the lead agency within the Ohio Department of Natural Resources in all matters dealing with preservation of the Little Miami Scenic River.

III. TASKS

A. Recommended Program Activities (Action Program)

Continue to provide technical assistance to riverfront landowners. Bank stabilization techniques and other methods of river preservation requiring labor and equipment should be provided on a case by case basis and as staff and equipment are available.

Expand efforts in public information and education to promote river preservation activities and address stewardship of the scenic river corridor. Focus efforts on news media events and news articles. Continue to encourage the active involvement of volunteer organizations (i.e., Scouts, 4-H, conservation groups, etc.).

Emphasize the role of the Scenic Rivers Program in providing resource information and technical assistance to local governments, landowners, and organizations.

B. Legislative Activities

The Scenic River Council should research and evaluate existing legislation to determine its function and the extent of management authority available in scenic river areas.

Develop amended/new legislation where appropriate to provide management ability.

C. Property Management

Actively pursue acquisition of conservation easements from willing sellers, or more importantly, as gifts from donors through landowner assistance and education efforts. Distribute materials explaining the general tax advantages of this type of agreement to riverfront landowners upon request.

All properties acquired for purposes of preservation and/or public access should be managed by the Division of Natural Areas & Preserves.

Develop plan for new property acquisitions based on following three criteria:

- Lands which are of true preservation quality.
- Lands necessary for proper and controlled public access.
- Lands which are strategic or endangered

Review property currently owned and devise management/development plans where needed.

D. Budget Review

The Advisory Council will continue to work toward adequate funding for the Little Miami Scenic River.

PROPOSED IMPLEMENTATION ACTIVITIES

BANK STABILIZATION AND REFORESTATION ACTIVITIES:

ODNR's Scenic Rivers Program should continue to actively pursue providing technical assistance to public agencies and riverfront landowners in controlling areas of critical erosion through vegetative control and reforestation. A priority should be placed on landowner projects involving the donation of conservation easements and/or forest maintenance agreements before utilizing state personnel and resources.

STREAM QUALITY MONITORING:

Continue efforts to educate the public regarding river preservation and to monitor changes in water quality through the Stream Quality Monitoring Program. Emphasis should be placed on expanding volunteer coordination of this program to reduce necessary scenic river staff commitments.

ZONING/TECHNICAL ASSISTANCE:

The Scenic River Program should continue to emphasize its cooperative role in providing assistance and information to local governments to encourage voluntary preservation and wise management of the Little Miami Scenic River Corridor.

LEGISLATION:

The Advisory Council will research and evaluate existing legislation impacting scenic river preservation activities with an aim toward amending/developing new legislation to provide proper management ability. Areas to be researched include: law enforcement (concurrent jurisdictions), commercial user fees of access areas, reclamation law improvements (set back requirements for surface mining), state trail designation of abandoned railroad, etc.

PUBLIC PROJECTS:

ODNR should pursue the concept of memorandums of understanding with involved agencies (ODOT, OEPA, ARMY CORPS, COUNTY ENGINEERS, etc.) to facilitate early coordination and environmental mitigation on public projects impacting the Little Miami Scenic River (bridge replacement, channel modifications, wwtps, line crossings, etc.

PUBLIC RELATIONS:

Increase public awareness of SRP efforts on the LMSR through regular news media articles and events, highlighting Ohio Rivers Month, litter cleanups, nature hikes and floats, etc. Also focus on river etiquette promotion in cooperation with Division of Watercraft and area canoe liveries.

LAND ACQUISITION:

Develop a priority list of properties and/or conservation easements which should be acquired.

PROPERTY MANAGEMENT:

Review status of current state owned lands and prepare management plans as needed focusing on river preservation as the top priority.

PERSONNEL:

Supplement existing Southwest Ohio Scenic Rivers staff with addition of one assistant river coordinator and one ranger/naturalist.

OTHER:

An inventory should be undertaken to determine if Todd's Fork, Massie Creek and East Fork (tributaries of the Little Miami Scenic River) qualify for state designation.

ADDENDUM
PROPERTY MANAGEMENT
PRIORITY LIST

Mathers Mill

Oregonia Access

Caesar Creek Nature Preserve

Fort Ancient

Halls Creek

Deerfield Gorge

Glenn Island

Miamiville Access

the White House
President George W. Bush

For Immediate Release
Office of the Press Secretary
September 18, 2002

Executive Order: Environmental Stewardship and Transportation Infrastructure Project Reviews

By the authority vested in me as President by the Constitution and the laws of the United States of America, and to enhance environmental stewardship and streamline the environmental review and development of transportation infrastructure projects, it is hereby ordered as follows:

Section 1. **Policy**. The development and implementation of transportation infrastructure projects in an efficient and environmentally sound manner is essential to the well-being of the American people and a strong American economy. Executive departments and agencies (agencies) shall take appropriate actions, to the extent consistent with applicable law and available resources, to promote environmental stewardship in the Nation's transportation system and expedite environmental reviews of high-priority transportation infrastructure projects.

Sec. 2. **Actions**. (a) For transportation infrastructure projects, agencies shall, in support of the Department of Transportation, formulate and implement administrative, policy, and procedural mechanisms that enable each agency required by law to conduct environmental reviews (reviews) with respect to such projects to ensure completion of such reviews in a timely and environmentally responsible manner.

(b) In furtherance of the policy set forth in section 1 of this order, the Secretary of Transportation, in coordination with agencies as appropriate, shall advance environmental stewardship through cooperative actions with project sponsors to promote protection and enhancement of the natural and human environment in the planning, development, operation, and maintenance of transportation facilities and services.

(c) The Secretary of Transportation shall designate for the purposes of this order a list of high-priority transportation infrastructure projects that should receive expedited agency reviews and shall amend such list from time to time as the Secretary deems appropriate. For projects on the Secretary's list, agencies shall to the maximum extent practicable expedite their reviews for relevant permits or other approvals, and take related actions as necessary, consistent with available resources and applicable laws, including those relating to safety, public health, and environmental protection.

Sec. **3**. **Interagency Task Force**. (a) **Establishment**. There is established, within the Department of Transportation for administrative purposes, the interagency "Transportation Infrastructure Streamlining Task Force" (Task Force) to: (i) monitor and assist agencies in their efforts to expedite a review of transportation infrastructure projects and issue permits or similar actions, as necessary; (ii) review projects, at least quarterly, on the list of priority projects pursuant to section 2(c) of this order; and (iii) identify and promote policies that can effectively streamline the process required to provide approvals for transportation infrastructure projects, in compliance with applicable law, while maintaining safety, public health, and environmental protection.

(b) **Membership and Operation**. The Task Force shall promote interagency cooperation and the establishment of appropriate mechanisms to coordinate Federal, State, tribal, and local agency

consultation, review, approval, and permitting of transportation infrastructure projects. The Task Force shall consist exclusively of the following officers of the United States: the Secretary of Agriculture, Secretary of Commerce, Secretary of Transportation (who shall chair the Task Force), Secretary of the Interior, Secretary of Defense, Administrator of the Environmental Protection Agency, Chairman of the Advisory Council on Historic Preservation, and Chairman of the Council on Environmental Quality. A member of the Task Force may designate, to perform the Task Force functions of the member, any person who is part of the member's department, agency, or office and who is either an officer of the United States appointed by the President with the advice and consent of the Senate or a member of the Senior Executive Service. The Task Force shall report to the President through the Chairman of the Council on Environmental Quality.

Sec. **4**. **Report**. At least once each year, the Task Force shall submit to the President a report that: (a) Describes the results of the coordinated and expedited reviews on a project-by-project basis, and identifies those procedures and actions that proved to be most useful and appropriate in coordinating and expediting the review of the projects.

(b) Identifies substantive and procedural requirements of Federal, State, tribal, and local laws, regulations, and Executive Orders that are inconsistent with, duplicative of, or are structured so as to restrict their efficient implementation with other applicable requirements.

(c) Makes recommendations regarding those additional actions that could be taken to: (i) address the coordination and expediting of reviews of transportation infrastructure projects by simplifying and harmonizing applicable substantive and procedural requirements; and (ii) elevate and resolve controversies among Federal, State, tribal, and local agencies related to the review or impacts of transportation infrastructure projects in a timely manner.

(d) Provides any other recommendations that would, in the judgement of the Task Force, advance the policy set forth in section 1 of this order.

Sec. **5**. **Preservation of Authority**. Nothing in this order shall be construed to impair or otherwise affect the functions of the Director of the Office of Management and Budget relating to budget, administrative, and legislative proposals.

Sec. **6**. **Judicial Review**. This order is intended only to improve the internal management of the Federal Government and is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or equity by a party against the United States, its departments, agencies, instrumentalities or entities, its officers or employees, or any other person.

GEORGE W. BUSH
THE WHITE HOUSE,
September 18, 2002.

FHWA Exemplary Ecosystem Initiatives

Criteria for Selection

When developing ecosystem and habitat conservation initiatives or identifying existing practices, the following criteria should be addressed:

1. **An exemplary ecosystem initiative helps sustain or restore natural systems and their functions and values.**

   Ecosystems are interconnected communities of living things, including humans, and the physical environment within which they interact. Healthy and well-functioning ecosystems are vital to the protection of our diverse biological resources, and to sustaining the economies and communities that rely on their products and benefits. Some of the key processes essential to naturally functioning ecosystems include water flow (hydrology), storage and cycling of nutrients, minerals, and energy, and biological community dynamics (disturbance, competition, and succession). Without the maintenance of these processes, ecosystems are unable to sustain stable, productive, biological communities; therefore, ecosystem and habitat conservation projects must identify, protect, and restore key processes in order to achieve ecosystem goals.

2. **An exemplary ecosystem initiative is developed within a landscape context.**

   In many cases, key ecosystem processes cannot be fully integrated or replaced at one location, which is why ecosystem initiatives should be developed within a landscape context. Traditional mitigation for transportation impacts tends to be site specific, with little consideration of how the project fits into the context of the surrounding ecosystem. Under the ecosystem approach, the frame of reference and project objectives are much broader and are applied within a defined geographic framework such as an ecoregion, watershed, species range, or transportation planning area. Exemplary ecosystem initiatives should address landscape-scale resource needs (e.g., habitat fragmentation, historic wetland losses) that extend beyond the immediate vicinity of a given project and strive to support sustainable and natural ecosystem conditions, not simply accommodate short-term needs or demands. The geographic scope should be large enough to generate regional, ecological benefits that compensate for impacts resulting from a single project or the cumulative impacts of multiple actions.

3. **An exemplary ecosystem initiative uses partnering and collaborative approaches to advance common goals.**

   The environmental process requires multi-disciplinary involvement and input from review/permitting agencies that have jurisdiction over the resources that may be impacted as a result of transportation decisions. These agencies need to be engaged during planning and development to define successes and solutions to environmental issues. Many States and review/permitting agencies have recognized that watershed and ecosystem approaches to enhancement, restoration, and preservation of aquatic and upland ecosystems can expedite the environmental review process while maximizing benefit to the environment.

   Partnering and collaborative approaches are essential when developing ecosystem and habitat conservation initiatives. Each of the selection criteria depends, to some degree, on successful partnering and collaboration with review/permitting agencies and other stakeholders. Partners should work together to determine resource needs at a landscape scale and identify ways in which all parties can contribute to and benefit from achieving ecosystem objectives. Mitigation and enhancement activities can then be targeted to help advance regional conservation goals. In this way, FHWA shares with its' partners in the development of the initiative, gains their early buy-in, and helps ensure success.

4. **An exemplary ecosystem initiative uses the best available science in ecosystem and habitat conservation.**

   The best available science is a critical element in the development of ecosystem initiatives and should be fully integrated into the decision-making process. The ecosystem approach requires scientific understanding and information concerning the interaction of physical, chemical, and biological processes that sustain ecosystem composition, structure, and function. Aspects of using the best available science include application of scientifically credible methods, monitoring, and analysis procedures as well as cutting edge approaches and/or technologies (e.g., habitat restoration techniques, habitat connectivity analysis, and GIS applications). Best available science and/or technology should be used to determine key project elements such as project goals (e.g., protect and enhance habitat connectivity, prevent habitat loss, degradation, and fragmentation, avoid wildlife mortality, enhance ecosystem productivity, diversity, and stability), project location(s), key ecosystem processes, appropriate parameters to characterize baseline conditions and measure project effectiveness, project sustainability, and management and monitoring needs.

   Due to the complexity of natural systems, there is often uncertainty about how ecosystems function and what the effect of management actions may be. Furthermore, data is often sparse, and it may not be possible or feasible to gather enough data upfront to eliminate this uncertainty. Adaptive management is a concept that encourages decision makers to move forward with available information and learn from the results of their choices. The adaptive management approach uses an iterative process of acting, learning, and leveraging what is learned, rather than just investing in data gathering. Project sponsors may want to consider the use of adaptive management principles when developing an exemplary ecosystem initiative.

5. **An exemplary ecosystem initiative provides clear examples of innovative environmental solutions by transportation agencies and achieves high standards in the environmental process.**

   The scope of the ecosystem initiative should be clear with respect to:

   - the resources in question and the need for innovative solutions to preserve and enhance them;
   - the overall goals, both from an ecosystem perspective and a highway perspective, that were met by this solution; and
   - the methodology used to bring about the solution (e.g., effective use of stakeholder involvement, innovative partnerships, and funding mechanisms).

   Exemplary ecosystem initiatives should clearly demonstrate how an ecosystem approach (e.g., watershed-based mitigation) will generate benefits (e.g., greater predictability in transportation project timelines, ability to address multiple project impacts in a comprehensive manner, more effective habitat conservation, and elimination of temporal loss of wetland and riparian areas).

6. **An exemplary ecosystem initiative achieves high quality results.**

   The initiative should have well-defined (quantifiable) goals and a management system (e.g., monitoring and/or management plan) in place to provide systematic review and evaluation throughout the implementation and operation phases. If appropriate, the initiative should include a mechanism for long-term management or protection of the project area(s).

7. **An exemplary ecosystem initiative is recognized by environmental interests as being particularly valuable or noteworthy.**

   Exemplary initiatives should be able to demonstrate wide support by environmental agencies and public interest groups. This may be evidenced by their involvement in the project or by statements of support. The FHWA may choose to involve environmental agencies in the review of initiatives to be identified as exemplary and seek endorsement of the initiatives as particularly valuable or noteworthy.

Outstandingly Remarkable Values (ORVs)

The following eligibility criteria are offered to foster greater consistency within the federal river-administering agencies. They are intended to set minimum thresholds to establish ORVs and are illustrative but not all-inclusive. If utilized in an agency's planning process, these criteria may be modified to make them more meaningful in the area of comparison, and additional criteria may be included.

1. **Scenery (S):** The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features and/or attractions. When analyzing scenic values, additional factors -- such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions are viewed -- may be considered. Scenery and visual attractions may be highly diverse over the majority of the river or river segment.

2. **Recreation (R):** Recreational opportunities are, or have the potential to be, popular enough to attract visitors from throughout or beyond the region of comparison or are unique or rare within the region. Visitors are willing to travel long distances to use the river resources for recreational purposes. River-related opportunities could include, but are not limited to, sightseeing, wildlife observation, camping, photography, hiking, fishing and boating. Interpretive opportunities may be exceptional and attract, or have the potential to attract, visitors from outside the region of comparison. The river may provide, or have the potential to provide, settings for national or regional usage or competitive events.

3. **Geology (G):** The river, or the area within the river corridor, contains one or more example of a geologic feature, process or phenomenon that is unique or rare within the region of comparison. The feature(s) may be in an unusually active stage of development, represent a "textbook" example, and/or represent a unique or rare combination of geologic features (erosional, volcanic, glacial, or other geologic structures).

4. **Fish (F):** Fish values may be judged on the relative merits of either fish populations, habitat, or a combination of these river-related conditions. *Populations:* The river is nationally or regionally an important producer of resident and/or anadromous fish species. Of particular significance is the presence of wild stocks and/or federal or state listed (or candidate) threatened, endangered or sensitive species. Diversity of species is an important consideration and could, in itself, lead to a determination of "outstandingly remarkable." *Habitat:* The river provides exceptionally high quality habitat for fish species indigenous to the region of comparison. Of particular significance is habitat for wild stocks and/or federal or state listed (or candidate) threatened, endangered or sensitive species. Diversity of habitats is an important consideration and could, in itself, lead to a determination of "outstandingly remarkable."

5. **Wildlife (W):** Wildlife values may be judged on the relative merits of either terrestrial or aquatic wildlife populations or habitat or a combination of these conditions. *Populations:* The river, or area within the river corridor, contains nationally or regionally important populations of indigenous wildlife species. Of particular significance are species considered to be unique, and/or populations of federal or state listed (or candidate) threatened, endangered or sensitive species. Diversity of species is an important consideration and could, in itself, lead to a determination of "outstandingly remarkable."*Habitat:* The river, or area within the river corridor, provides exceptionally high quality habitat for wildlife of national or regional significance, and/or may provide unique habitat or a critical link in habitat conditions for federal or state listed (or candidate) threatened, endangered or sensitive species. Contiguous habitat conditions are such that the biological needs of the species are met. Diversity of habitats is an

important consideration and could, in itself, lead to a determination of "outstandingly remarkable."

6. **Prehistory (P):** The river, or area within the river corridor, contains a site(s) where there is evidence of occupation or use by Native Americans. Sites must have unique or rare characteristics or exceptional human interest value(s). Sites may have national or regional importance for interpreting prehistory; may be rare and represent an area where a culture or cultural period was first identified and described; may have been used concurrently by two or more cultural groups; and/or may have been used by cultural groups for rare sacred purposes. Many such sites are listed on the National Register of Historic Places, which is administered by the NPS.

7. **History (H):** The river or area within the river corridor contains a site(s) or feature(s) associated with a significant event, an important person, or a cultural activity of the past that was rare or one-of-a-kind in the region. Many such sites are listed on the National Register of Historic Places. A historic site(s) and/or features(s) is 50 years old or older in most cases.

8. **Cultural (C):** The river or area within the river corridor contains archaelogical sites or areas significant to traditional cultures. Examples might be American Indian burial grounds, petroglyphs, the oldest known human use site in a region, or streams that support traditional agriculture, subsistence fishing, or religious ceremonies.

9. **Other Values (O):** While no specific national evaluation guidelines have been developed for the "other similar values" category, assessments of additional river-related values consistent with the foregoing guidance may be developed -- including, but not limited to, hydrology, paleontology and botany resources.

Potential Classification

The Act and Interagency Guidelines provide the following direction for establishing preliminary classifications for eligible rivers:

1. **Wild rivers (W):** Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

2. **Scenic rivers (S):** Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

3. **Recreational rivers (R):** Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

OHIO STREAM MANAGEMENT GUIDE

"Who Owns Ohio's Streams?"

Guide No. 02

Over the years, Ohio citizens have frequently contacted the Department of Natural Resources seeking assistance in the resolution of problems they have encountered related to water resources. Many of the questions posed have concerned the authorities and duties of government, as well as the rights and responsibilities of individuals, with regard to surface water. This fact sheet poses some of the more frequently-asked questions, and provides the responses which have been passed along. It is intended to assist the lay person in understanding the basic legal concepts involved with some of Ohio's more common water rights issues. A more comprehensive analysis can be obtained through review of the references cited, which is strongly recommended. For those persons involved in water rights conflicts, this fact sheet is intended as a prelude to consultation with an attorney, not as a substitute for it.

Who owns Ohio's streams? Ohio's Constitution does not address this question, nor has there been a statute enacted in Ohio to address it. So the answer must be derived from the common law.

What is "the common law"? The common law, in this context, is the system of law initially developed in England by the higher courts and stated in the written opinions of these courts based on general customs or on reason and fixed principles of justice.[1&2] English common law had been adopted in the American colonies prior to the Revolutionary War, and those parts of it that were consistent with the Constitution of the United States were retained. Since then, opinions of federal and state courts in this country have modified, refined, and added to the common law of the United States and the State of Ohio.

What if the federal or state government passes a law that contradicts the common law? This type of law, called a statute, overrides the common law. Common law is used by the courts to interpret statutes and to determine the outcome of cases in which statutes are not controlling.

Are there situations not addressed by the common law? Yes, but because the common law is founded on the "laws of nature and the dictates of reason", even in the absence of a precedent it is adaptable to new situations and circumstances.[1&2] A precedent is a past decision of a higher court (an appeals court or supreme court) which serves as an example for other courts to follow in similar cases. In situations where there is no clear precedent to follow, it is difficult to predict how the common law may be adapted or modified. Even in situations where there is a clear precedent, it still may be modified or reversed by a new court decision and a new precedent established. Significant changes to the common law, which normally are the result of Ohio or U.S. Supreme Court decisions, occur due to changing circumstances, an expanding knowledge base, and changing attitudes in society and in the courts.

So what does the common law say about who owns Ohio's streams? There are two components to a stream, the water flowing in it and the land beneath the water. The nature of flowing water makes it impossible for a landowner to exercise the kind of control over it that is essential for it to be considered private property. Despite a landowner's efforts to retain it, the water will inevitably seep into the ground or evaporate into the air or flow downhill onto the next property. Water is a "public good" and not ownable as private property. Landowners do have rights to make use of the water flowing through their property including the right to withdraw it and otherwise control it to the extent that nature permits, so long as the rights of others are not infringed upon.[3] Such rights are known as "riparian rights", meaning they are derived through the ownership of streamside property.

As to who owns the land beneath a stream, under Ohio common law the owner of the land beside the stream also owns the land beneath it. If the land on each side is owned by two different owners, then each owns to the center of the stream unless otherwise specified by the landowners' deeds. On navigable streams there is a public right of navigation, spelled out originally in the Northwest Ordinance, which states that navigable waters shall be common highways, forever free to the people of the United States. On such streams, boaters have the right to navigate on the stream, regardless of who owns the land beside it. Because of this, some have claimed that the owners of land beside a navigable stream do not own the land beneath it. But Ohio courts have

long held that the owners of the land on the banks of a navigable stream are also owners of the beds to the middle of the stream, as in the common law.[4] One exception is the submerged land beneath the Ohio portion of Lake Erie, which is owned and held in trust for the public by the State of Ohio.

Does a landowner who owns the land on both sides of a stream (and, therefore, beneath the stream as well) have the right to construct a dam across it? There are no constitutional provisions and, in most instances, no statutes that address this type of action. Under the common law, dam construction is allowed so long as it doesn't infringe on the rights of others. If a dam is constructed so that the water retained behind it backs up onto an upstream landowner's property and causes harm, the dam owner may be held liable in court for an unreasonable interference with the flow of surface water.[5] If the dam curtails the flow of water downstream and prevents reasonable uses by downstream property owners, the dam owner may also be held liable in court. If the dam collapses during a normal flood and causes harm to downstream landowners, the dam owner may likewise be held liable.[6] On navigable streams, the construction of a dam may interfere with the public's right to navigate the stream. This could result in a court decision disallowing a dam because it is an impediment to the public's right of navigation.[7]

There are also both state and federal statutes which are, in some instances, relevant to construction of a dam. Depending on the size of the dam and the amount of water it would retain, it may fall under the jurisdiction of Ohio's dam safety statute which requires a construction permit from the Ohio Department of Natural Resources, Division of Water.[8] The purpose of the dam safety program is to require that dams are designed and constructed according to appropriate specifications to assure their structural integrity and the public safety. On a few large rivers in Ohio, construction of dams and other impediments to navigation is regulated by the U.S. Army Corps of Engineers. Impediments to navigation on these streams are generally not permitted.[9] Construction of a dam may also constitute placement of fill into waters of the United States, which may require a federal permit, also from the U.S. Army Corps of Engineers.[10] The federal and state statutes which are relevant to dam construction are outlined in Guide 06 *Permit Checklist for Stream Modification Projects.*

Whether or not a stream is navigable seems to affect landowner rights in Ohio. What is a navigable stream and how can I find out if a particular stream is navigable? Under Ohio common law, navigability cannot be determined by a precise formula which fits every stream under all circumstances and at all times. This means that the courts must decide the navigability of streams one at a time, on a case-by-case basis. Factors provided as guidelines for the courts include the stream's capacity for boating in its natural condition, its capacity for boating after the making of reasonable improvements and its accessibility to public destinations.[11] A natural temporary obstruction to navigation, such as a logjam or sandbar, does not destroy the otherwise navigable nature of a stream.

Traditionally, a test of navigability has been whether a stream is used or could be used as a highway for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water. Recently, the definition of navigability has been broadened to include a stream's capacity for recreational navigation as well. The modern view is that navigation for pleasure and recreation is as important in the eyes of the law as navigation for commercial purposes.[12] At any rate, under Ohio common law it is not possible to know with certainty whether or not a specific stream is subject to the public's right of navigation until a court has made such a determination.

Navigability is also defined in different ways by several federal and state statutes based upon the regulatory jurisdictions of the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency. These definitions are relevant only within the context of the statutes in which they appear. More information about these statutes and their applicability can be found in Guide 06 *Permit Checklist for Stream Modification Projects.* Fact sheets explaining Section 404 permits and Section 401 water quality certifications are available from the Ohio Environmental Protection Agency by calling (614) 644-2001.[13]

Do landowners along a stream have the right to improve drainage on their land and route the drainage outlets into the stream? Again, there are no constitutional provisions or statutes which address this concern. Under the common law in Ohio, landowners have the right to make a reasonable use of their land, even though altering the flow of surface water may cause harm to others. Landowners incur liability only when their harmful interference with the flow of surface water is unreasonable.[14]

But if the outlet is a "natural watercourse," aren't property owners allowed to discharge drainage water into it even if it does cause damage downstream? Yes, but only if their actions are reasonable. Historically, the courts in Ohio maintained that upstream landowners could place surface water above and beyond the natural flow into natural watercourses without being liable to downstream owners.[15] However, more recent court decisions have applied a "reasonable use" rule instead. Under this rule, landowners are neither permitted to dispose of surface water any way they wish nor are they prohibited from interfering with the natural flow of

surface water to the detriment of others. Landowners are liable for damages caused by their interference with the natural flow of surface water only when their actions are "unreasonable".[14]

Who determines when the harmful interference with the flow of surface water is unreasonable? The reasonability of an alteration of the flow of surface water is decided by the courts on a case-by-case basis. A landowner along a stream who believes he or she has been harmed by another streamside landowner's actions must seek relief through court action. The court determines whether or not the harm is significant and material, whether it is unreasonable, and what the appropriate remedy should be. If the court determines that the harm is significant and material and that it is unreasonable, it may require that the action causing the harm be discontinued by granting an injunction against it. The court may also allow the action causing the harm to continue, but specify that compensation for damages be paid.

If a drainage improvement diverts water into a stream from land that does not naturally drain into that stream, isn't that illegal? Not necessarily. Historically, when the courts in Ohio allowed upstream landowners to place surface water above and beyond the natural flow into natural watercourses without being liable to downstream owners, one of the conditions was that none of the additional water could come from outside the watershed.[15] However, since the courts have been applying the reasonable use rule, the prohibition on diversion may no longer apply.[16] Under the reasonable use rule, such a diversion may be allowed unless a court determines that it constitutes a harmful interference with the flow of surface water that is unreasonable.

It is important to note that a state statute overrides the common law for diversions of water out of either the Lake Erie or Ohio River Basins in quantities greater than 100,000 gallons per day. A permit from the Ohio Department of Natural Resources is required for such diversions.[17] And under federal statute, diversions out of the Lake Erie Basin, regardless of quantity, must have the approval of all the Great Lakes States' Governors.[18]

Who is responsible for clearing natural obstructions, such as logjams and sandbars, from streams to keep them free flowing? It is not clear than anyone has such a responsibility. Governmental entities at the municipal, county, state, and federal levels have the statutory **authority** to undertake stream clearing and drainage improvement projects, but no governmental entity at any level has been assigned by statute the **responsibility** for such activities. The common law also does not specify that property owners must keep the streams flowing through their property clear of natural obstructions. Natural obstructions in a stream on one property may cause harm to upstream property owners by reducing the stream's capacity for conveying runoff, resulting in flooding or reducing the effectiveness of artificial drainage systems. If these problems were caused by a landowner's actions, such as the construction of a dam across the stream, this harm would be actionable in court. It is unclear whether or not a landowner's inaction in failing to remove natural obstructions from the stream is similarly actionable.

On watercourses where drainage improvements have been made under authority of County Ditch[19] statutes, there are requirements for maintenance that may include removal of logjams, sandbars, and other natural obstructions. A county ditch project doesn't change a streamside landowner's basic rights to the use of the watercourse and, in fact, improves its capacity for carrying away excess water. The county (or a joint county board for multi-county drainage projects) retains a maintenance easement along the stream, and is required by the statute to maintain the original drainage project.[20] Landowners pay an annual maintenance assessment for these services. There are similar maintenance provisions on streams where water management improvement projects have been undertaken by one of Ohio's Conservancy Districts.[21]

Municipal governments also have the authority to undertake stream clearing and drainage improvement projects, and some cities and villages have enacted ordinances requiring that streams be maintained in their free-flowing states within the municipal boundaries.

The statutory authorities available for removing obstructions are discussed in Guide 04, A *Catalog of Contacts for Stream Topics.* The Ohio Department of Natural Resources recommends that, before an obstruction removal project is begun, consultation be made with the applicable local, state, and federal agencies listed in Guide 06, *Permit Checklist for Stream Modification Projects.* The extent of permit requirements will depend on the location and design of the particular project.

REFERENCES:

1 H.C. Black, 1968, Black's Law Dictionary, Definitions of Terms and Phrases of American and English Jurisprudence, Ancient and Modern, Revised Fourth Edition, edited by the publisher's editorial staff, West Publishing Company, St. Paul, Minnesota.

2 P.B. Gove, editor in chief, 1966, Webster's Third New International Dictionary of the English Language Unabridged, G.&C. Merriam Company, Springfield, Massachusetts.

3 3 Kent Comm. 439 (3d, 1836); VI-A Amer. L. of Prop. § 28.55 (1954); Cooper v. Williams, (1831), 4 Ohio St.

253, 287; Salem Iron Co. v. Hyland, (1906), 74 Ohio St. 160, 165. An excellent discussion on this topic and on water rights generally can be found in: Callahan, C.C. & J.R. Hanson, 1979, Principles of Water Rights Law in Ohio, 2nd edition, Ohio Department of Natural Resources, Division of Water, Columbus, Ohio. Additional information specific to water withdrawal rights can be found in: Hanson, J.R., A.F. Woldorf, & L.P. Black, 1991, Water Rights—An Overview of Ohio Water Withdrawal Law, 2nd edition, Ohio Department of Natural Resources, Division of Water, Columbus, Ohio.

4 Gavit v. Chambers, (1828), 3 Ohio St. 496.

5 Fox v. Fostoria, (1897), 14 OCC 471, rev. on other grounds, 60 Ohio St. 340; Neff v. Sullivan, 9 OD Repr. 765.

6 East Liverpool City Ice Company v. Mattern, (1920), 101 Ohio St. 62.

7 State ex rel. Brown v. Newport Concrete Company, (1975), 44 Ohio App. 2d 121.

8 Ohio Revised Code, § 1521.06.

9 Federal River and Harbor Act of 1899, Section 10.

10 Federal Water Pollution Control Act Amendments of 1972, Section 404.

11 Coleman v. Schaeffer, (1955), 163 Ohio St. 202.

12 Mentor Harbor Yachting Club v. Mentor Lagoons, (1959), 170 Ohio St. 193.

13 Section 404 Permits and Section 401 Water Quality Certifications, Ohio Environmental Protection Agency fact sheets.

14 McGlashan v. Spade Rockledge Corp., (1980), 62 Ohio St. 2d 55. See also: Myotte v. Mayfield, (1977), 54 Ohio App. 2d 97; Chudzinski v. Sylvania, (1976), 53 Ohio App. 2d 151; Masley v. Lorain, (1976), 48 Ohio St. 2d 334. An excellent discussion on this and related topics can be found in: Brown, L.C. and J.L. Stearns, Ohio's Drainage Laws—An Overview, Bulletin 822, OSU Extension, Columbus, Ohio.

15 Munn v. Horvitz, (1964), 175 Ohio St. 521.

16 Joseph, v. Wyss, (1991), 72 Ohio App. 3d 199.

17 Ohio Revised Code, §1501.32.

18 Federal Water Resources Development Act of 1986, Section 1109.

19 Ohio Revised Code, Chapters 6131, 6133, 6135, and 6137.

20 The maintenance requirement applies only to county ditch projects done after 1957.

21 Ohio Revised Code, Chapter 6101.

This Guide is one of a series of Ohio Stream Management Guides covering a variety of watershed and stream management issues and methods of addressing stream related problems. All Guides, including an **Index of Titles**, are available from the Ohio Department of Natural Resources. To obtain copies contact the ODNR Public Information Center at:

1952 Belcher Drive Building. C-1
Columbus, Ohio 43224-1386
614/265-6791

The guides are also available on-line as web pages and PDF files so you may print high quality orignals at your location. You will find the guides on-line at: http://www.dnr.state.oh.us/odnr/water/pubs/onlnpubs.html.

For more information call the ODNR, Division of Water at 614/265-6739. Each Guide is designed to be easily and clearly reproduced and can be bound in a notebook. **Single copies are available free of charge. When distributing guides at meetings or in mailings, please use the printed editions or the PDF file as a master for reproducing the number of copies you need.**

Prepared by the Ohio Department of Natural Resources, Leonard P. Black, Division of Water, principal author. Input from staff of several ODNR divisions and other local, state and federal agencies is used in the development of the Ohio Stream Management Guides. Funding for the production of the Ohio Stream Management Guides is provided in part through a federal grant under section 319 of the Clean Water Act. This Ohio Stream Management Guide is not intended to function as advice on legal issues. Please contact an attorney if legal advice is required..

Guides are available on-line at:
http://www.dnr.state.oh.us/odnr/water/pubs/onlnpubs.html

OHIO Department of Natural Resources

An equal opportunity employer--M/F/H.
Printed on recycled paper

OHIO STREAM MANAGEMENT GUIDE

Forested Buffer Strips

Guide No. 13

Trees along streams are so vital to the integrity of streams in climates like Ohio's, they are given the name "forested buffer strips." This Ohio Stream Management Guide is designed to give landowners, land managers and volunteer groups general guidance on the creation, protection and enhancement of forest areas along streams.

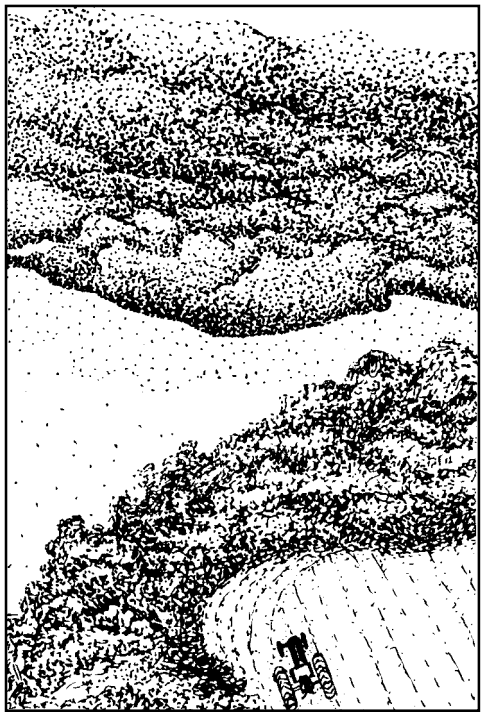


Figure 1. A forested buffer strip as seen from the air.

BENEFITS PROVIDED BY FORESTED BUFFER STRIPS

Streamside forests nurture Ohio's streams. The stream and it's adjacent land (riparian area) together form the most vital and diverse feature of Ohio's landscape. Without trees in this land-water transition zone, streams typically become wide and shallow, habitat is degraded and water quality drops.

Riparian ecosystems with forest vegetation:

- remove pollutants from stream flows during periods of over-bank flow;
- reduce water temperatures by sheltering and shading;
- provide wildlife habitat and protect and create aquatic habitat;
- provide detritus (leaves and woody debris), which is the basic source of energy for the stream ecosystem; and
- reduce streambank erosion through the high durability of tree root mass.

THREATS TO FORESTED STREAM BUFFERS

Encroachment — Meandering ribbons of trees often show up on aerial photos. Clearing trees has historically occurred last along streams and rivers leaving forested riparian strips winding through farm fields and suburbs. From a stream management perspective, we are fortunate that these areas are rough, steep and subject to flooding, making them generally less desirable for intensive land uses. However, most forested buffer strips only remain today because of decisions made independent of stream benefits. Until the importance of riparian areas is understood, forested buffer strips will be extremely vulnerable to encroachment as adjacent land uses become more intense. In fact, a major cause of buffer strip loss and stream degradation continues to be encroachment.

Overuse — Stream-side areas are often popular recreation areas, but overuse can reduce the integrity of the buffer through soil compaction and vegetation loss. High use can coexist with water quality objectives and damage limited by establishing trails and stabilized access points to the stream. Trails parallel to a stream should be set away from the banks. Provide viewing and lounging access to the stream through branches of trail which access the inside of meander bends. This

Figure 2. A forested buffer between a stream and other land uses

will minimize impacts and leave the critical vegetation on the outside banks undisturbed.

Grazing — Forested buffers are degraded by livestock. Not only is vegetation and soil damaged on the banks and uplands areas, but livestock trample and degrade the stream channel. Typical impacts include wide shallow channels with less cover, less shade, increased nitrates, increased turbidity, compacted soils and poor ground cover and understory. One Ohio study cited a 40% reduction in soil loss after livestock were fenced from a stream.

PROTECTING STEAMSIDE FORESTS

Define the Buffer Strip Width — Riparian areas are definitive land forms. They are transition zones between channels and uplands where the land influences the stream and the stream influences the land. It is in this zone that 'buffer strips' of forest vegetation have special importance for the quality of streams. Riparian areas correspond very well with the active flood plain. The active floodplain is the area that would become flooded if stream levels rose above the maximum bankfull depth (see Figure 3). Estimations of riparian area boundaries may also be based on floodplains identified on federal Flood Insurance Rate Maps. Lastly, county soil survey reports list soils 'subject to frequent flooding' which may help delineate some riparian areas.

It is not always feasible to base buffer strip width on the riparian area. For example, highly entrenched channels may have a riparian area hardly wider than the channel itself and in other places floodplains and riparian areas may be so extensive that encroachment is inevitable. For these conditions a generic minimum standard may be useful. One such standard is based on a dimension equal to two and one-half times the bankfull channel width or 50 feet, whichever is less (see Figure 4). This distance is then measured away from the bankfull channel to arrive at the standard buffer width.

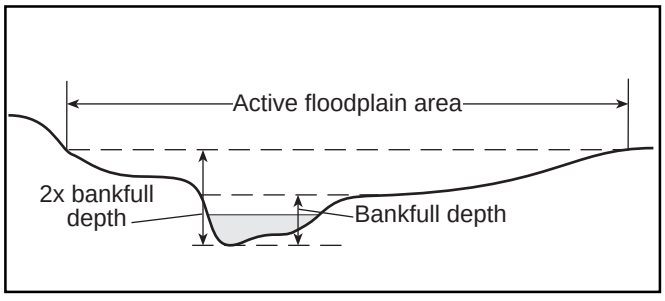


Figure 3. Buffer strip width defined by the active floodplain

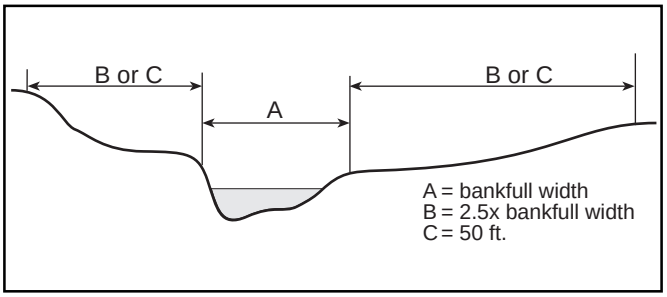


Figure 4. Buffer strip width defined by a minimum standard

Fence livestock from the stream — Stream fencing is a practice which keeps livestock away from the stream channel. Stream fencing projects often include stock tanks and water lines. Assistance for fencing livestock from streams may be sought through:

- Ohio State University Extension, Grazing Coordinator, 614/ 397-0401.
- USDA-Natural Resources Conservation Service (NRCS), Grazing Coordinator, 614/ 653-1559.
- County offices for the NRCS and local Soil & Water Conservation Districts, listed under County Government in local phone directories.

Establish a Legal Easement — One of the best ways to protect riparian areas is to establish legal easements, also known as conservation easements. Easements allow you to protect your streamside forests without giving up ownership. An easement is a legal agreement that protects a land's conservation value by restricting certain actions which can be taken, even by future owners. Among other things, riparian protection easements can prohibit or restrict timber harvesting, pesticide spraying and development in the buffer strip. The landowner may receive or waive compensation. The easement is held by a legally qualified conservation organization (such as a land trust) or a government agency. Conservation easements can be tailored for each landowner and situation, so may differ from property to property.

The following private organizations and public agencies are among those who can provide you information or assistance in creating a legal easement:

- The Trust for Public Land, 612/ 338-8494
- American Farmland Trust, 202/ 659-5170
- Land Trust Alliance, 202/ 638-4725
- The Nature Conservancy, 614/ 717-2770
- Ohio Department of Natural Resources, Division of Natural Areas and Preserves, 614/ 265-6460
- Ohio Department of Natural Resources, Division of Soil and Water Conservation, 614/ 265-6637
- Soil and Water Conservation Districts, listed under County Government in local phone directories

Erect Visual Barriers — Easements alone are only lines on paper which have proven to be ineffective against encroachment. One study found that 90% of easement protected forested buffers had been encroached upon to some extent, with 45% severely degraded. Visual barriers such as fences or signs appeared to be most effective at stopping encroachment.

REFORESTATION METHODS

Allow Natural Regeneration — Simply establishing a preservation area or "no-mow" zone may be enough to allow natural forest regeneration if there are some trees nearby to provide a seed source. This may not work in areas without trees which have been farmed or have managed turf. Areas with intrusive species or dense turf may require some site preparation to improve regeneration potential.

Transplant Woody Plants — A number of sources for trees exist including commercial nurseries, the ODNR Division of Forestry, and compatible sites where you obtain permission to harvest plants. A list of flood tolerant tree species is found in Guide No. 08, *Trees for Ditches*. Planting dormant cuttings such as willow posts and stakes is discussed in Guide No. 07, *Restoring Streambanks with Vegetation*.

A combination of tree planting and natural regeneration may be a good choice for certain areas. For example, natural regeneration may be adequate for the majority of a buffer strip but trees may need to be planted adjacent to the stream to expedite streambank stabilization or to restore a tree canopy over the stream.

Species Selection:

- It is best to use a diverse mix of tree and shrub species with an emphasis on native species.
- Species should be mixed randomly across the site.
- In areas of partial shade, use a large proportion of shade-tolerant species.
- Ideally a mix of dominant tree species, understory trees and shrubs, and herbaceous plants should be planted.
- In open areas, it may be useful to mix hardier pioneer species (two-thirds) with later successional species (one-third) in recognition of the difficult environment for new plants.

Pioneer Species	***Later Successional Species***
Cottonwood	Swamp white oak
Box elder	Pin oak
Red maple	Black walnut
Ash (green)	Silver maple
Red osier dogwood	Hawthorn
Gray dogwood	Black haw viburnum
Silkey dogwood	Maple leaf viburnum
Sycamore	

Stocking Rates — Common reforestation stocking rates are 600 -1,000 seedlings per acre or 500 containerized stock per acre. If planting in the fall or in high use areas, seedlings are generally not recommended. Seedlings are best planted after the ground thaws and before April 14.

Soil Preparation — Depending on soil conditions, the site may benefit from pre-planting preparation, including lime and/or fertilizer, and disking or plowing.

Stabilization — A cover of annual grains such as wheat, rye or oats at 1 to 1 1/2 bushel per acre may need to be planted to temporarily stabilize soil during the establishment period. Perennial grasses are not recommended because of their competition with woody vegetation.

Maintenance — Within the first two years, monitor at least monthly during the spring and summer. Once per month in the fall and winter should be adequate. On these monitoring visits check the planted sites for soil moisture, competing vegetation, mulch and pruning needs; maintain as needed. Fertilizing is not recommended during the first two years of plant growth.

Competing Vegetation — Competing vegetation is a critical factor to monitor for during the first two years. Minimize competition from weeds and grasses through hand weeding where feasible, or mowing, mulching and use of selected herbicides.

References:

Mecklenburg, Dan, 1996, "Rainwater and Land Development, Ohio's Standards for Stormwater Management, Land Development and Urban Stream Protection," Ohio Department of Natural Resources.

Lewis, S., J. Kopec, D. Rice, 1991, "Ohio's Streamside Forests: The Vital, Beneficial Resource," The Ohio Department of Natural Resources, Division of Natural Areas and Preserves.

~

This Guide is one of a series of Ohio Stream Management Guides covering a variety of watershed and stream management issues and methods of addressing stream related problems. The overview Guide listed below, is intended to give the reader an understanding of the functions and values of streams. For more information about stream management programs, issues and methodologies, see *Guide 05 Index of Titles* or call the ODNR Division of Water at 614/265-6739. All Guides are available from the Ohio Department of Natural Resources. Single copies are available free of charge and may be reproduced. Please contact:

ODNR Public Information Center
1952 Belcher Drive Bldg. C-1
Columbus, Ohio 43224-1386
614/265-6605

The guides are also available on-line as web pages and PDF files so you may print high quality originals at your location. You will find the guides on-line at:

http://www.dnr.state.oh.us/odnr/water/pubs/onlnpubs.html.

Prepared by the Ohio Department of Natural Resources, Dan Mecklenburg, Division of Soil and Water Conservation, principal author. Input from staff of several ODNR divisions, and local, state and federal agencies are used in the development of the Ohio Stream Management Guides. Funding for the production of the Ohio Stream Management Guides is provided in part through a federal grant under Section 319 of the Clean Water Act.

Guides are available on-line at: http://www.dnr.state.oh.us/odnr/water/pubs/onlnpubs.html

OHIO Department of Natural Resources

An equal opportunity employer--M/F/H.
Printed on recycled paper