

# Chippewa Creek

Balanced Growth Initiative  
Watershed Plan

2008

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The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of the National Oceanic and Atmospheric Administration, Department of Commerce, Ohio Department of Natural Resources, or the Office of Coastal Management.

Additional funding is provided by the Chippewa Creek Watershed communities and partners.





# Chippewa Creek

## Balanced Growth Initiative Watershed Plan

2008

The Chippewa Creek Balanced Growth Plan is a community-driven land suitability plan that will assist communities in balancing economic growth with conservation of critical and valuable natural resources.



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### ABOUT THE CHIPPEWA CREEK WATERSHED PLANNING PARTNERSHIP

The members of the Chippewa Creek Watershed Planning Partnership are appointed by the mayors of the three watershed communities and are assisted in the planning process by agencies and institutions working toward watershed stewardship.

### ABOUT THE CUYAHOGA RIVER COMMUNITY PLANNING ORGANIZATION (CRCPO)

The CRCPO is the nonprofit organization that manages the Cuyahoga River Remedial Action Plan (RAP) and the Cuyahoga American Heritage River Initiative, and works to support cleanup efforts and long term community stewardship of the Cuyahoga River Watershed and Area of Concern.



### Additional Support for the work of the Chippewa Creek Watershed Partners comes from:

Cuyahoga Valley National Park – Kevin Skerl

Cleveland Metroparks – Patricia Stevens

Cuyahoga Soil & Water Conservation District – Janine Rybka

Cuyahoga County Planning Commission – Carla Regener

Cuyahoga County Board of Health – Donna Childs

# Executive Summary

## Chippewa Creek

Chippewa Creek, located in Cuyahoga County, is an urbanizing watershed within the Cuyahoga River Watershed and the Cuyahoga Remedial Action Plan Area of Concern.

Chippewa Creek represents one of the last remaining relatively healthy subwatersheds in the Lower Cuyahoga River Watershed. This watershed serves as a natural water management system, but past and current changes in land use continue to alter the watershed and reduce functionality of this natural infrastructure.

### WATERSHED CHARACTERISTICS

Chippewa Creek Watershed covers approximately 17 square miles, and drains portions of five communities – Brecksville, Broadview Heights, North Royalton, Seven Hills and Parma. Chippewa Creek stretches nearly eight miles, winding through suburban neighborhoods and, before discharging into the Cuyahoga River, flows through the Cleveland Metroparks' Brecksville Reservation and the Cuyahoga Valley National Park.

Chippewa Creek has many of the problems an urbanizing watershed can have. Development in the past occurred with little regard to watershed function. Building in wetlands and encroaching in floodplains with little or no storm water control has altered drainage patterns and the frequency and severity of flooding.

Approximately 26% of the watershed remains undeveloped and these areas are filled with critical natural features. The keys to restoring Chippewa Creek include properly conserving these natural resources as communities expand and enhancing and restoring areas that have been impacted in the past.

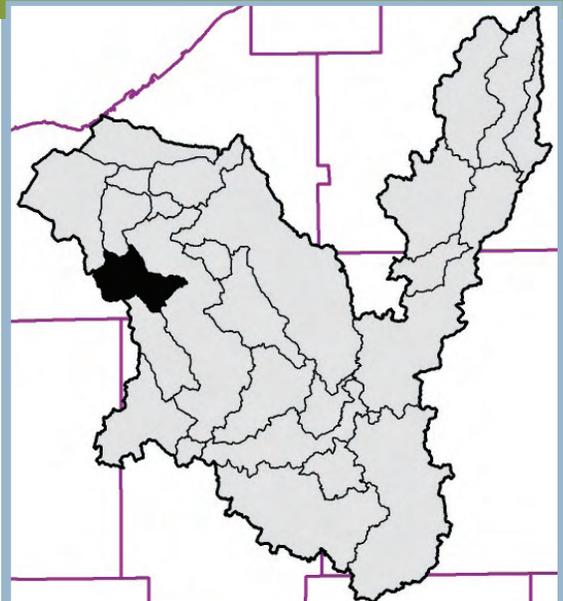
### USE-ATTAINMENT

Chippewa Creek is designated by Ohio EPA as a "Warm Water Habitat". This designation means that Chippewa Creek should be able to support a well-balanced population of fish and aquatic insects. Prior to the mid 1990s the entire stream was unhealthy and did not support balanced communities. Recent studies have shown the creek has improved.

The Lower Half of Chippewa Creek (from the City of Brecksville to the National Park) is healthy and in full attainment. The upper half lacks a healthy fish community and is therefore only in partial attainment.

Following Ohio EPA's last field assessment in 1996, there have been numerous pollutant reduction efforts in Chippewa's upper watershed. Such efforts include the elimination of: inadequate wastewater treatment plants, failing home sewage treatment systems and leachate from the Norton landfill.

However, increased urbanization and resultant runoff continues to be a major pollution source that needs to be addressed throughout the creek.



### MAJOR ISSUES

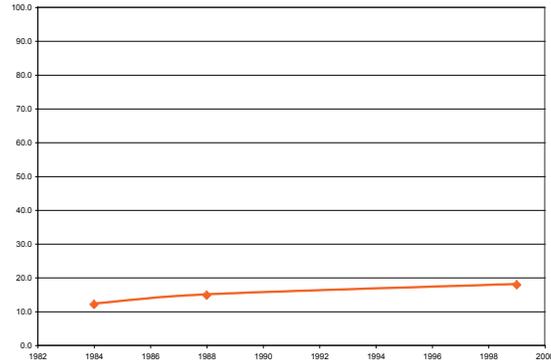
in the Chippewa Creek Watershed

- Managing a flood-prone watershed
- Addressing remaining large tracts of undeveloped land
- Increasing urbanization
- Loss of important forest canopy
- Critical downstream natural resources
- Integrating BGI plans into local master plans and regulations



# Executive Summary Chippewa Creek

Increase in Imperviousness, 1982 – 1999

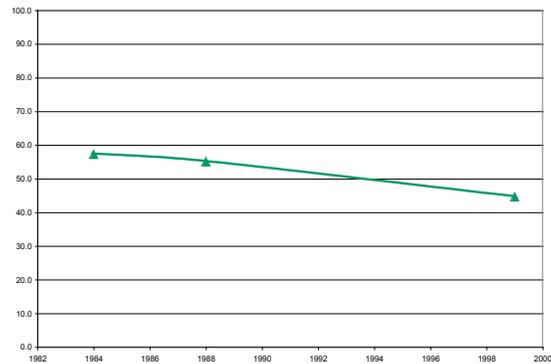


## IMPERVIOUS COVER

Approximately 18% of the Chippewa Creek watershed is covered by impervious surfaces. Trends suggest that impervious cover has increased by 44% from 1984 to 1999. Many of these surfaces contain no stormwater management devices and directly drain and contribute excessive runoff to receiving streams, causing downstream flooding and property erosion.

Research indicates that 26% is the maximum percentage of impervious cover in which streams can still commonly meet aquatic life standards. However, when important watershed features exist, such as forested riparian corridors and influx of groundwater, streams may still meet attainment even at greater levels of urban land use. (Yoder et al., 2000)

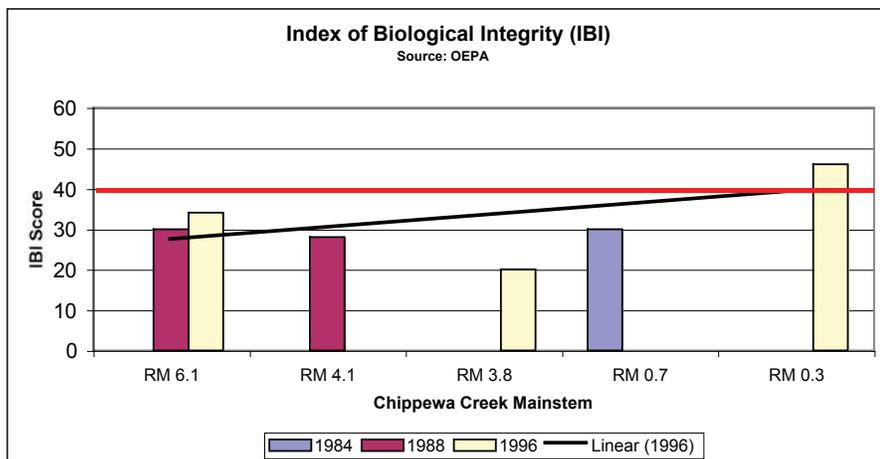
Decrease in Forest Canopy, 1982 – 1999



## FOREST CANOPY COVER

Data indicates that forest canopy in Chippewa Creek has decreased 23%. In 1984, the watershed contained 57% canopy coverage, but decreased to 44% in 1999. Future watershed management objectives include:

1. Working with the communities to develop target canopy cover goals that are appropriate for the level of development and for optimal watershed function;
2. Developing a tree canopy program that can be implemented by communities to preserve and restore canopy on public and private lands.



## AQUATIC BIOLOGY

The upper and middle sections of the creek, upstream from Brecksville, contain relatively unhealthy fish populations. This can be attributed to polluted runoff from expanding suburban land use, sedimentation from under-managed construction activity and stream bank erosion from increased storm water runoff.

Also, waterfalls in Chippewa Creek may inhibit upstream replenishment of fish populations.

GRAPH #3

As the creek moves into the Brecksville Reservation and the Cuyahoga Valley National Park the health of aquatic life substantially improves. Both parks provide excellent riparian zones, wetlands and cobbled substrates, which together provide a setting for aquatic communities to flourish. Fish and aquatic insect communities near the mouth of Chippewa have improved significantly since 1984.

Due to the pollution reduction stated previously, Ohio EPA anticipates that Chippewa's upper reaches will show improvement during the next field assessment.

**DEVELOPING EVALUATION CRITERIA for PRIORITY CONSERVATION and PRIORITY DEVELOPMENT AREAS**

The Plan seeks to provide guidance on which land is suitable for development and which is a priority for conservation, as well as how such land can be preserved and protected.

The Chippewa Creek prioritization process began with community input to identify and prioritize critical areas and features. The results of scoring priorities identified floodwater management as the most important issue for the watershed planning process. The second most important issue was erosion control, followed by forest cover and forested stream corridors. These priorities were helpful in providing a focus and, in turn, were used to identify priority conservation areas.

**OVERALL METHODOLOGY**

1. Identify and Evaluate Community Issues and Desires (eg. frequent flooding, etc.)
2. GIS Data Analysis of Chippewa’s Natural Features
3. Qualitative Assignment of Natural Features: Reflect Community Needs & Watershed Function
4. Identify Undeveloped Land with Relation to Natural Features
5. Priority Conservation Areas & Priority Development Areas

Identifying and Evaluating Community Issues and Desires  
Chippewa Creek Priorities for Conservation of Important Watershed Features  
(PCA methodology)

<b>Features / Scoring Priority</b>	<b>Totals (Possible 42pts)</b>	<b>%</b>
Areas in imminent danger of property damage or loss	42	100
Floodplains for flood water management purposes	41	98
Wetlands for flood water management	39	93
Small streams and primary headwater areas for flow management	37	88
Steep slopes for erosion protection	37	88
Forest Corridors for flow and bank stability purposes	36	86
Wetlands for water quality and filtering	34	81
Stream banks and corridors for sediment prevention	33	79
Forest Areas which provide significant habitat / connections	32	76
Areas w/ potential for greenspace connections & trails	30	71
Areas that provide multiple functions and benefits	30	71
Wetlands for habitat enrichment	30	71
Areas adjacent or in close proximity to Metroparks / CVNP	28	66
Stream banks for habitat benefit	27	64
Floodplains for open space / park purposes	24	57
Large land tracts for significant vistas / greenspace	24	57
Forest areas which provide vistas	19	45
Steep slopes for vistas	15	36
<i>Other watershed features</i>		
Potential Retention / Detention Basins	9	
Stream Clearance	3	
Areas of high restoration value (filled wetland /channelized streams)	3	
Land fill reclamation to absorb storm water	3	
Stream debris removal	3	
Forest Canopy	3	
Runoff management	3	

# Executive Summary Chippewa Creek

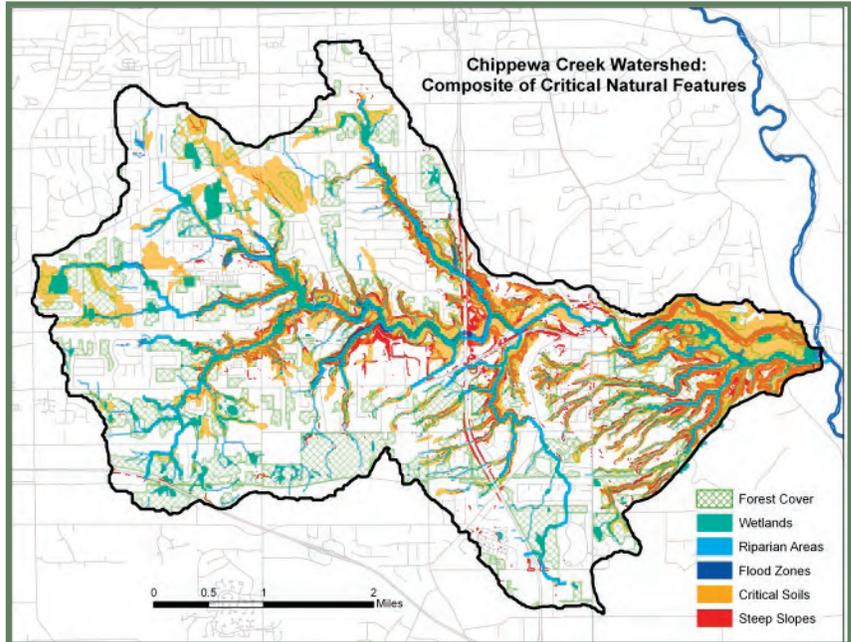
## CRITICAL NATURAL FEATURES

The natural features that are the focus of study when addressing how effectively the watershed functions include:

- soils • slopes • streams and riparian zones • flood plains • wetlands • forests.

Each feature was mapped individually to show where that feature appeared in the watershed, then combined to show the concentration of features in certain areas of the watershed.

This map (right) displays the critical natural features “layered-up”. It represents the priorities of the watershed partnership as well as the most important functional elements of the watershed.



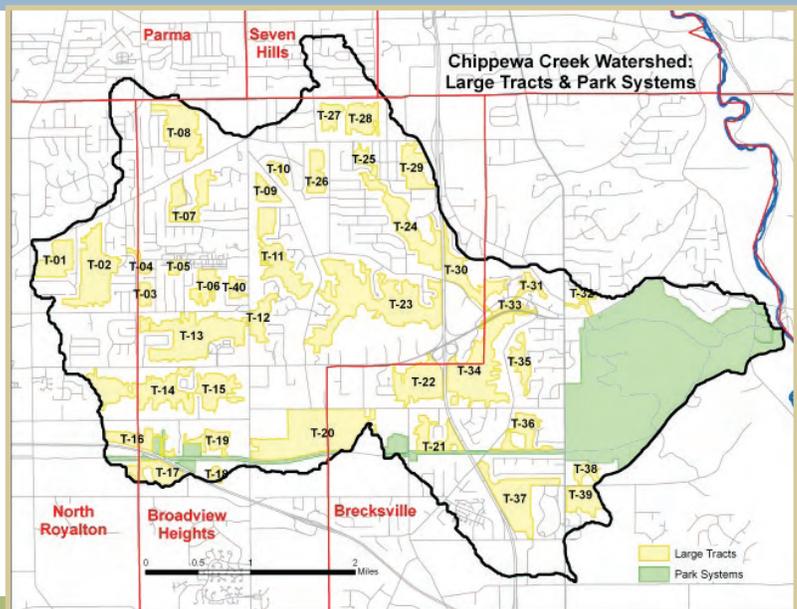
The next step in the analysis was to identify large areas of undeveloped land, where pressures to develop would be greatest

## LARGE UNDEVELOPED TRACTS

To determine the undeveloped land areas we used GIS land cover data generated by the Cuyahoga Valley National Park.

The characteristics of the undeveloped land areas varied from flat, heavily forested upland areas that may have high development pressure; land adjacent to creek gorges, with steep terrain that could prove difficult for developers; to back lots of “bowling alley” sized parcels that could be assembled for future development.

The map (right) shows these areas of undeveloped land.

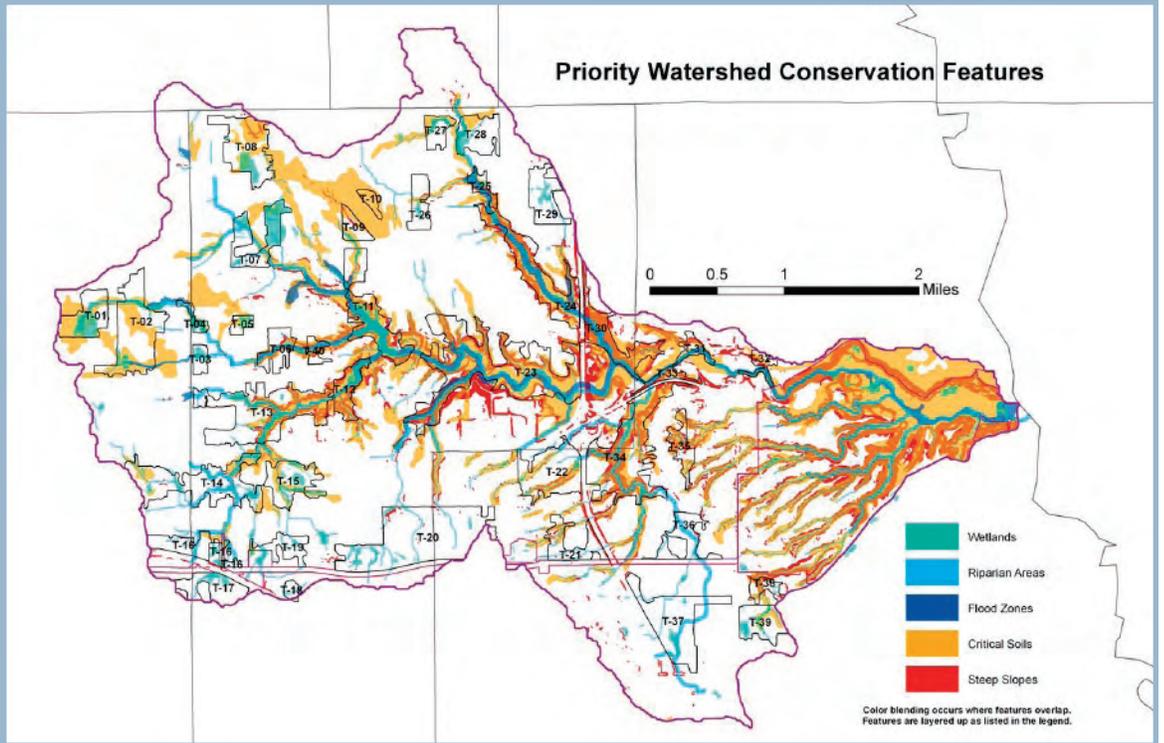


## ANALYSIS OF LARGE TRACTS

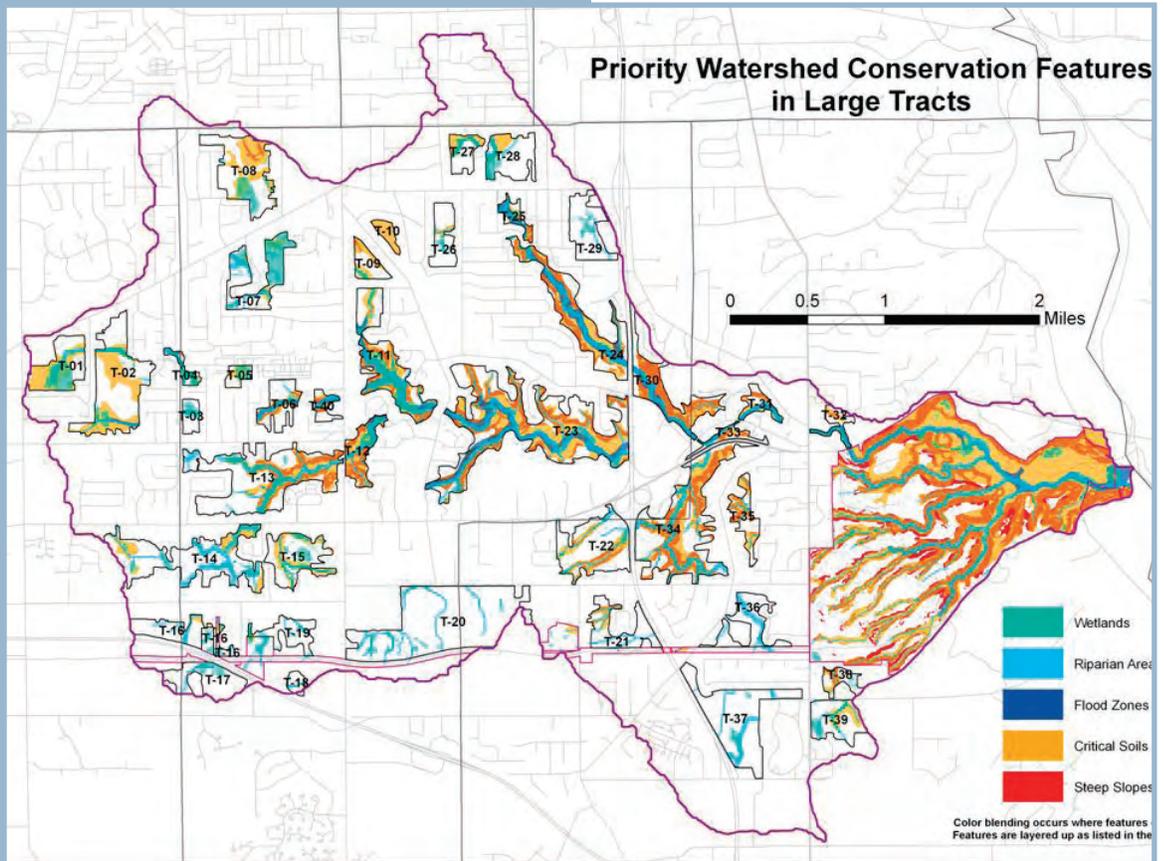
	Total Acres	Critical Soils	Steep Slopes	Flood Zones	Riparian Corridors	Headwater Riparian Corridors	Forest Cover	Wetlands
Large Tracts (acres)	2,608.9	1,032.4	338.9	160.0	316.6	115.4	2,304.7	244.3
Non-Park Watershed Total (acres)	10,119.1	2,267.8	847.4	246.2	526.6	248.2	2,934.6	280.8
Large Tracts as % of Non-Park Watershed	26%	46%	40%	65%	60%	46%	79%	87%

The analysis indicates that although these large tracts represent only 26% of non-park land, they hold the vast majority of wetlands, forests, floodzones and riparian corridors, and almost half the watershed’s other critical features. The opportunity exists to conserve these resources and their functions and should be a priority.

Critical Features AND Large Undeveloped Land Areas



Critical Features IN Large Undeveloped Land Areas



### Priority Conservation Areas

Priority conservation areas are locations where land use change is predicted to have a high impact on the watershed in terms of flooding, erosion, and water quality, based on the analysis of several data sets representing criteria that the watershed planning partners determined were of interest.

- **CRITICAL SOILS**

Recommendation: In critical soil areas, communities should develop soil compaction limitations to help conserve this resource during construction. Conservation and low impact design standards are recommended.

- **STEEP SLOPES**

Recommendation: In steep slope areas, communities should conserve these resources to the maximum extent possible for health, safety, property and environmental concerns. Setbacks should be implemented on slopes of 12% or more.

- **STREAMS & NATURAL RIPARIAN AREAS**

Recommendation: Stream and riparian corridor areas should be protected from encroachment at all costs. Communities should adopt riparian setback ordinances to protect both headwater and primary headwater streams. Where impacts occur in these areas, mitigation within the immediate drainage area should be required .

- **FLOODPLAINS**

Recommendation: Communities should conserve flood plains to accommodate excess flow, protect health and property. Community regulations need to maintain current flood plain maps and adequately protect floodplains from development to reduce future damages.

- **WETLANDS**

Recommendation: Wetland areas should be conserved as essential storage and filtration systems. Communities should adopt ample setback ordinances for all wetlands categories.

- **FORESTS**

Recommendation: Communities should conserve forested areas within riparian corridors and minimize the loss of existing forested areas throughout the entire watershed, through conservation development and tree preservation regulations.

### Priority Development Areas

Priority development areas are locations where land use changes are predicted to have minimal impact on the watershed and where conditions suggest that additional development may be appropriate.

The Chippewa Creek Watershed includes five municipalities with zoning, water and sewer availability and many other factors deemed important for development (see “Top Ten Development Suitability Factors” inset.)

The height of development pressure in the five communities has largely passed. Most of the communities report a waning of development proposals.

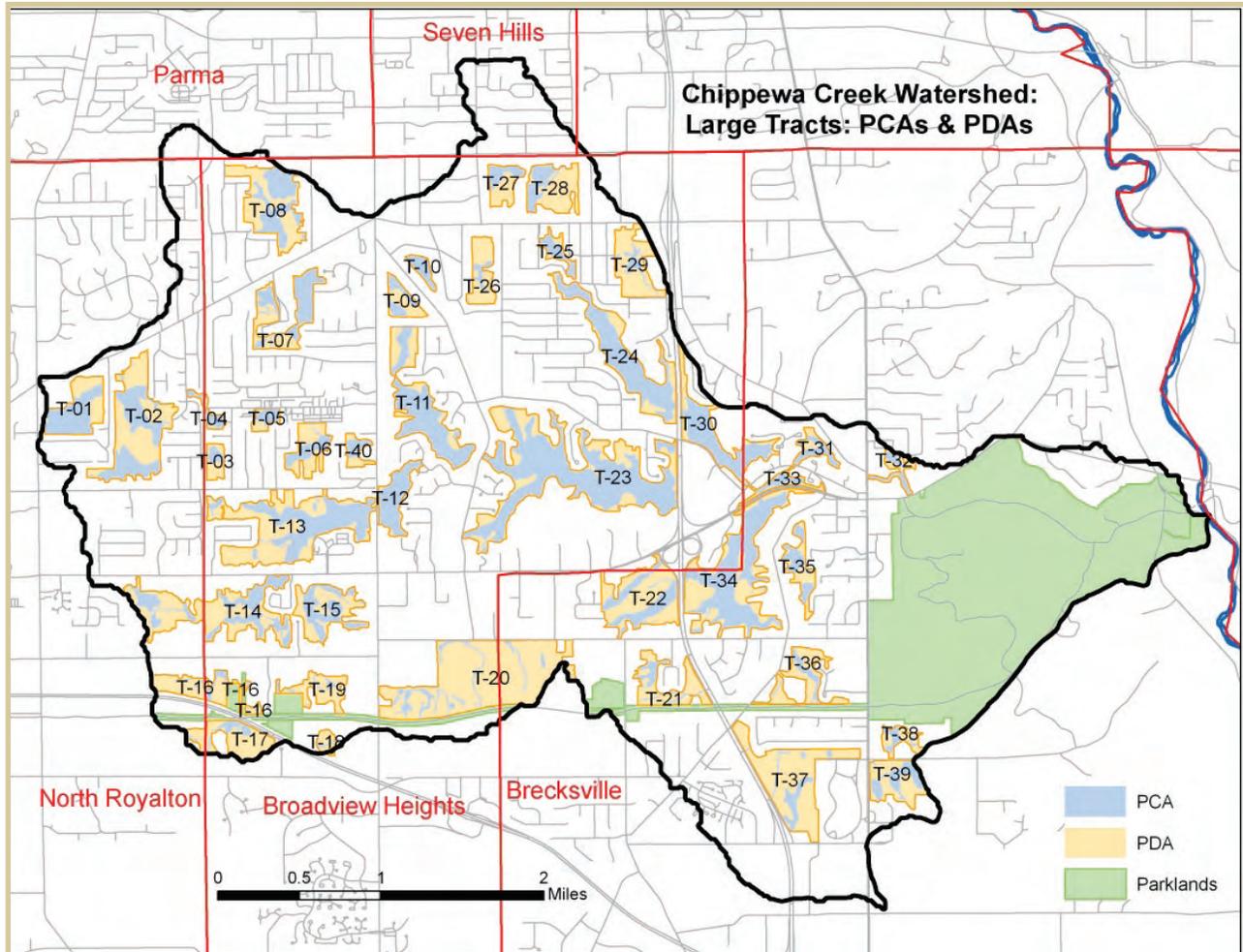
Nevertheless, priority development areas were identified tract by tract with community and land owner recommendations.

PDA characteristics are:

1. Undeveloped land that does not lie within critical watershed features (i.e. wetland setback, riparian setback, FEMA 100 year floodplain, steep slope)
2. Previously developed areas suitable for redevelopment

The Ohio Lake Erie Commission Balanced Growth Program established a development suitability technical advisory committee to determine which factors were most important to the development community.

See the table opposite for the results. >>>



### TOP TEN DEVELOPMENT SUITABILITY FACTORS

RESIDENTIAL	COMMERCIAL	INDUSTRIAL
1. Public water availability	1. Public water availability	1. Proximity to highway
2. Public sewer availability	2. Public sewer availability	2. Public sewer availability
3. Pro-development community attitude	3. Median household income in community	3. Public water availability
4. School quality	4. Community population density	4. Land availability
5. Land cost	5. Proximity to highway	5. Proximity to highway interchange
6. Median household income in community	6. Community growth characteristics	6. Pro-development attitude of community
7. Land availability	7. Land availability	7. Proximity to employees.
8. Community growth characteristics	8. Pro-development community attitude	8. Land cost
9. Proximity to highway	9. Proximity to highway interchange	9. Soil type / stability
10. Proximity to highway interchange	10. Proximity to other commercial development	10. Median household income

## PRIORITIZING TOOLS FOR WATERSHED MANAGEMENT

The Watershed Partnership was asked to prioritize management tools and strategies that they would like implemented throughout the watershed. These management tools would help address a wide range of issues through planning measures, design standards, regulations, inter-community cooperation, funding etc.

Overall, on-site stormwater design practices was the most important, followed by protecting the riparian corridor, adopting the critical watershed features map for community guidance, and protecting flood zones.

This prioritization helped guide and focus recommendations to the communities.

TOOLS & PRACTICES	TYPE	#	%
On-site storm water retention practices	Design Standard	70	97%
Protect canopy in Riparian Corridor	Plan & Regulation	70	97%
Adopt Critical Watershed Features Map as Guidance for Community Conservation	Plan & Regulation	67	93%
Setback- Flood zones to protect function	Regulation	67	93%
Setback Flood zones to eliminate encroachment	Regulation	65	90%
Preserve intact mature canopy	Plan & Regulation	65	90%
Setbacks- Wetlands	Regulation	64	89%
Mandatory Conservation Development- 40% Open Space	Design Standard	64	89%
Setbacks on Critical Soils	Regulation	63	88%
Setback- Steep Slopes	Regulation	62	86%
Permanent establishment of Chippewa Group	Inter-Community Cooperation	62	86%
Regulatory consistency in communities	Inter-Community Cooperation	62	86%
Promote conservation easements	Individual Behavior	62	86%
Minimize paving- promote filter strips	Design Standard	61	85%
Seek grants for funding projects	Funding	61	85%
Cooperative planning and funding	Inter-Community Cooperation	60	83%
Develop on going monitoring and reporting and feedback	Measurable Outcomes	60	83%
Setbacks- Riparian Corridor	Regulation	58	81%
Cooperative code enforcement- shared resources	Inter-Community Cooperation	58	81%
Link education and outreach to Phase II PIPE	Individual Behavior	58	81%
Include watershed education in Community Newsletters	Individual Behavior	58	81%
Develop list of restoration/preservation projects	Restoration / Preservation	58	81%
Link riparian corridors to park connections	Restoration / Preservation	56	78%
Direct acquisition of critical watershed features	Restoration / Preservation	55	76%
Mitigation bank and credits in the watershed	Financial Incentives	52	72%
Develop annual grant match sinking fund	Funding	52	72%
Restore native species	Restoration / Preservation	47	65%
Allow & promote smaller, native lawns	Design Standard	46	64%
Seek SEP (Supplemental Environmental Project) funding	Funding	42	58%
Offer riparian plant packages	Plan & Regulation	36	50%
Tax based incentives to land owners	Financial Incentives	31	43%
Cooperative funding model to implement measures	Inter-Community Cooperation	27	38%

# INVENTORY OF LAND USE ORDINANCES

Land use activities directly influence the levels of pollution, flooding and erosion problems in the Cuyahoga River. Political fragmentation and uneven implementation and enforcement throughout these communities can lead to uneven protection of environmental and economic quality.

This is a summary of current ordinances in the Chippewa Creek Watershed. Analyzing this inventory can help our partnership more effectively identify gaps and to promote and educate for consistent protection measures watershed-wide.

PARAMETERS	Brecksville	Broadview Heights	North Royalton	Seven Hills	Parma
1. Flexible Development Options	YES	YES	YES	YES	YES
1a. Is the Flexible Development permitted "By Right"?	NO	NO	YES	NO	NO
1b. Minimum of Amount of Open Space (target 40%)	20%	40%	50%	25%	25%
1c. Are Density Bonuses provided for?	NO	NO	NO	NO	NO
1d. Low Impact Development Ordinance	NO	NO	NO	NO	NO
2. Riparian Setbacks Meet Recommended Widths	NO	YES	YES	NO	YES
2a. Riparian Setback is restricted from any changes (prohibited / permitted uses)	NO	YES	YES	NO	YES
3. Wetland Setbacks Meet Recommended Widths?	NO	YES	YES	NO	YES
3a. Isolated and Connected Wetlands are protected?	NO	YES	YES	NO	YES
3b. Wetland Setback is restricted from any Changes (prohibited / permitted uses)	NO	YES	YES	NO	YES
4. Variance procedures	NO	YES	YES	NO	YES
5. Mitigation Plan for Wetland & Riparian Impacts?	NO	NO	NO	NO	YES- but no specifics included
6. Steep Slope Protection?	YES	NO	YES	NO	NO
7. Conserve Floodplains- riparian setback includes floodplain?	NO- but provision exists to recognize floodplains	YES	YES	NO	YES
8. Critical Soils- minimize disturbance to natural features	YES	YES	YES	NO	YES
9. Tree / Forest Management Plan	NO	NO	NO	NO	NO



# Executive Summary Chippewa Creek

## In Conclusion:

Continued support by the communities of Chippewa Creek, the Watershed Planning Partnership and the Cuyahoga River RAP will be essential for ongoing improvement and stewardship within the watershed.

## Recommendations

### Short Term

- Establish an official Chippewa Creek Watershed Partnership-

The local watershed group should be predominantly comprised of local officials and citizens and serve an advisory role for local organizations and agencies. The group will help establish permanent representation for Chippewa Creek, implement the BGI recommendations and focus on future watershed objectives.

- Adopt a resolution among the watershed communities to formally recognize the Balanced Growth Plan-

The participating jurisdictions should agree to a Resolution which outlines the relationship and obligations of the jurisdictions within the Chippewa Creek BGI Watershed Plan. This step is critical to receiving state endorsement and future financial incentives.

- Submit BGI Plan to the State for approval-

The final BGI Plan will be submitted to the Ohio Lake Erie Commission for approval. Once the plan has endorsement from the State, financial incentives for conservation and development areas become available.

### Long Term

- Incorporate the PCA / PDA map into local master plans and zoning maps. Each jurisdiction's elected officials and approving bodies should follow their established public review processes for plan adoption. (See Best Local Land Use Practices- Practice #1)
- Update local ordinances and zoning codes as recommended in the plan- Each jurisdiction should update land use policies and documents, including comprehensive plans, zoning and subdivision regulations, to ensure consistency with the BGI Plan. Jurisdictions should work together on this task.
- Create uniform storm water codes throughout the watershed- this is to ensure that watershed protection and site development review processes are fair, consistent and apply evenly to all areas of the watershed as development and plan implementation moves forward.
- Explore developing a Transfer Development Rights / Purchase Development Rights / Density Transfer Program- As a long term goal, Development Rights Programs should be considered as part of the tool box of options to achieve conservation and direct development away from sensitive areas.
- Develop a mitigation banking system for wetlands and streams- Streams and wetlands need to be protected. Should an unavoidable impact occur, a compensatory mitigation plan needs to be ready to keep these critical resources in the watershed. (The Cuyahoga River RAP is in discussions with the Ohio Lake Erie Commission to facilitate a program for Chippewa Creek.)
- Identify needed Restoration and Enhancement Sites in Chippewa Creek Watershed- wetland sites in the watershed are currently being analyzed for restoration and enhancement potential. These wetland results, along with stream data, will be shared with the partnership and targeted for funding and remediation.
- Revise and update plan when needed- As different projects or watershed needs become apparent, additional chapters should be added to the BGI Plan.



## The Plan INTRODUCTION

Chippewa Creek, located in Cuyahoga County, is an urbanizing watershed within the Cuyahoga River Watershed and the Cuyahoga Remedial Action Plan Area of Concern. Chippewa Creek represents one of the last remaining, relatively healthy subwatersheds in the Lower Cuyahoga River Watershed. The creek drains portions of five communities and flows through the Cleveland Metroparks' Brecksville Reservation and Cuyahoga Valley National Park. Chippewa Creek watershed serves as a natural water management system, but past and current changes in land use continue to alter the watershed and reduce functionality of this natural infrastructure.

The Chippewa Creek BGI Plan is a resource for community decision makers to evaluate the potential impacts of land use changes in the watershed. The plan identifies Priority Conservation Areas (PCAs) and Priority Development Areas (PDAs). The Ohio Lake Erie Commission (OLEC) is coordinating with State agencies to develop state incentives and funding opportunities to assist communities in implementing Priority Development Areas and Priority Conservation Areas. Integrating the Chippewa Creek BGI Plan into a community's comprehensive plan is an important step in managing floodplains, wetlands, and open spaces that are currently providing flood control, erosion control and water quality protection. For additional information on the BGI, go to the OLEC website at [www.epa.state.oh.us/oleo](http://www.epa.state.oh.us/oleo).

The Cuyahoga River Community Planning Organization (CRCPO) received a grant from the Ohio Coastal Management Assistance Grants Program to develop a State-endorsed Chippewa Creek Balanced Growth Plan. CRCPO is doing this work with official support from Brecksville, Broadview Heights and North Royalton as a Pilot Project under the direction of the Ohio Balanced Growth Initiative (BGI).

## GOALS of THE CHIPPEWA CREEK BALANCED GROWTH INITIATIVE PLAN

1. Preserve existing watershed features and system capacity to manage stormwater runoff.
2. Restore / Enhance the watershed to improve stormwater management.
3. Recommend best land use practices to avoid or minimize impacts from development.

The Chippewa Creek Balanced Growth Plan is a community driven land suitability plan that will assist in balancing economic growth while conserving critical natural resources that benefit the watershed communities.

Every portion of the earth's landscape is characterized by a different set of features that render it more suitable for certain uses than others. Since all the earth's surface is divided into drainage areas, or watersheds, the concept of land suitability applies to watersheds as well. That is, different areas of a watershed are characterized by different sets of features that render them more suitable for certain uses and less suitable for others.

The objective of a land suitability process is to direct development to an area that is capable of handling this type of land use and, on the other hand, avoiding or minimizing development in areas that could prove hazardous. This concept emphasizes that land use planning and development should recognize watershed functions and other natural processes.

## PROJECT SCOPE

1. Organizing the Chippewa Creek Watershed Planning Partnership representing communities, organizations, agencies and residents.
2. Gathering data about the watershed's physical characteristics, geography, biology, geology and water quality so as to identify a baseline against which improvements can be measured.
3. Developing and agreeing upon criteria and creating a model for designating Priority Development Areas (PDAs) and Priority Conservation Areas (PCAs)
4. Identifying Priority Areas for development and conservation using the criteria
5. Providing guidance and action items for communities on land use ordinances and regulations
6. Developing a resolution for community adoption.
7. Finalizing the Chippewa Creek BGI Watershed Plan for state endorsement

## PCA

### Priority Conservation Areas

Priority conservation areas are locations where land use change is predicted to have a high impact on the watershed in terms of flooding, erosion, and water quality, based on the analysis of several data sets representing criteria that the watershed planning partners determined were of interest.

## PDA

### Priority Development Areas

Priority development areas are locations where land use changes are predicted to have minimal impact on the watershed and where conditions suggest that additional development may be appropriate.

# BALANCED GROWTH INITIATIVE

“Linking Land Use Planning to the Health of Watersheds”

Balanced Growth is a strategy being led by the Lake Erie Commission to protect and restore Lake Erie and its watersheds in order to assure long-term economic competitiveness, ecological health and quality of life.

Lake Erie is Ohio’s greatest natural resource and provides tremendous natural and economic benefits. Despite this, Lake Erie’s watershed has endured and continues to face many challenges. Urban Sprawl is one of the greatest of these challenges.

Total population in northeast Ohio has remained relatively stable. However, we continue to expand and develop. While development and community growth is encouraged, it is the manner in which the development occurs that is the most damaging. Of the 11,649 square mile area comprising the Ohio Lake Erie Watershed, over 78% has been altered from its original form, leaving only 22% relatively intact.

As a result of these ongoing problems, the Ohio Lake Erie Commission recognized the need to encourage communities to use their natural resources efficiently to benefit the economy and quality of life.



## KEY BGI GUIDELINES

- Use a regional focus in land use and planning.
- Create local Watershed Planning Partnerships to designate Priority Conservation Areas and Priority Development Areas.
- Adopt Watershed Plans and implement recommended model regulations to help promote best local land use practices that minimize impact on water quality and provide for well-planned development efficiently served by infrastructure.
- Align state policies, incentives, funding, and other resources to support watershed balanced growth planning and implementation.

## BGI LONG-TERM INTERESTS

- Sustaining and restoring natural systems in the Lake Erie basin.
- Encouraging the reuse and re-development of urban lands
- Maximizing the efficient use of infrastructure
- Conserving farmland
- Providing open space and recreational opportunity
- Promoting compact development patterns
- Helping local governments plan for economic development opportunities and stream-lined decision making
- Providing consistency and predictability for private and public development decisions

# Chippewa Creek Planning By Watershed

Ohio is a home rule state and much of the land use decisions are made at the local level. However, local officials are often faced with pressing issues (flooding) that cannot be effectively addressed within political jurisdictions.

Flooding and water quality problems transcend community boundaries. Multi-community cooperation and planning by watersheds is imperative in order to address these problems. Watershed planning also helps to leverage resources and complement regulatory programs (ex. NPDES Phase II) of local and state agencies.

## WATERSHEDS

Watersheds are complex systems of soils, waterways, water storage areas and vegetation that work together to manage the precipitation falling as rain or snow within a geographic area. All the water in a single watershed that does not evaporate into the air will eventually drain to a single stream, river or lake.

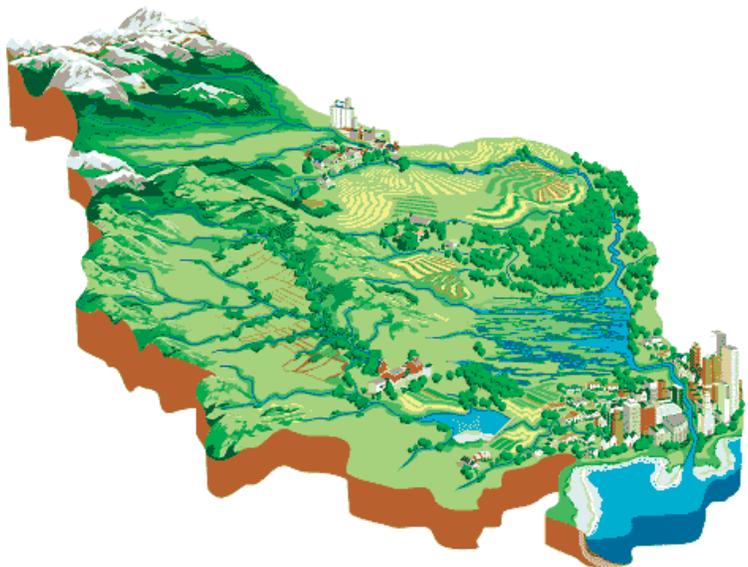
Watersheds function by:

- Pooling water to evaporate
- Soaking water into the soil
- Gathering surface water into streams

Streams and watersheds work together.

Streams are dynamic systems that adjust to compensate for changes in their watersheds and have the capacity to:

- Moderate the volume and energy of water
- Transport and deposit sediment
- Create and sustain aquatic habitat, and
- Assimilate or process a limited amount of pollutants and still achieve water quality standards.



**WETLANDS** are nature's way of trapping water, storing it, dissipating its energy, filtering out impurities, and slowly releasing it into streams and groundwater supplies. Wetlands store excess water that would otherwise contribute to flooding and stream bank erosion.

Wetlands provide critical habitat - food, shelter and nursery - for a wide variety of plants, birds, amphibians, insects and fish, all of which are necessary in order for ecosystems to thrive. Filling in and paving over wetlands eliminates these important functions and forces the water to flow headlong and unfiltered into streams.



**RIPARIAN ZONES** are heavily vegetated lands along streams that absorb water and dissipate energy. Leaves, soil and roots absorb water, reduce erosion and stabilize banks.

Vegetated corridors along streams provide for fish and wildlife migration: shade and cool water allowing more oxygen retention; and support habitats by providing nutrients and woody debris and cleaner runoff by filtering pollutants. Natural riparian zones are essential to stream function and need to be preserved.



**FLOODPLAINS** are natural rights-of-way and temporary storage areas for flooding events.

Floodplains are relatively flat areas along stream banks that absorb floodwaters, allowing for the slow release of water back into the stream.

Floodplains enhance biological productivity by supporting a high rate of plant growth. Floodplains provide excellent habitats for fish and wildlife by serving as breeding and feeding grounds. This helps to maintain biodiversity and the integrity of ecosystems.

Floodplains need to be kept undeveloped to allow for stormwater release and space for streams to meander.



## **PRIMARY HEADWATER STREAMS:**

Every stream begins somewhere. That somewhere is its headwaters, the network of small streams that blanket the landscape of every watershed. Primary headwater streams are like the capillary system of a blood supply network- just as the health of whole organism depends upon a functioning capillary system, the health of larger streams and rivers depend upon an intact primary headwater system. These small streams help control the flow of storm water, sediment and nutrients to larger streams. Headwaters are typically impacted the most during development and need protection.



# Chippewa Creek Watershed Features

**STEEP SLOPES** are features of stream valleys and need to be protected. Any significant disturbance to the hillside's environment may result in landslides or land instability, alteration in drainage patterns; and loss of scenic value. When development takes place on or near steep slopes (15% or greater), vegetative cover is greatly reduced, significantly increasing soil instability and erosion. Soil erosion and sedimentation into waterways poses several threats to public health and safety, including increased potential for flooding, that are difficult and expensive to correct. Property damage is commonly associated with development on steep slopes.

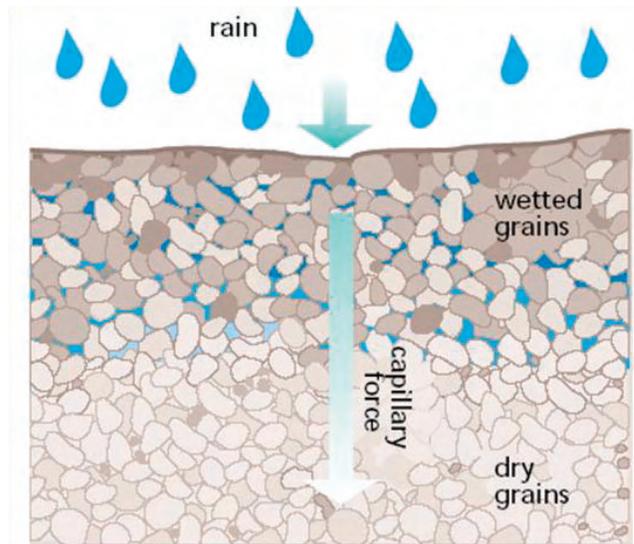


## CRITICAL SOILS

*Porous soils* such as sand and gravels provide an opportunity for groundwater recharge by stormwater and should be preserved as a potential stormwater management option. *Unstable or easily erodible soils* should be managed carefully with proper erosion and sedimentation practices.

Infiltration of stormwater into the soil reduces both the volume and peak discharge of runoff from a given rainfall event, and also provides for water quality treatment and groundwater recharge. Soils with maximum permeabilities (moderate infiltration and well drained soils) allow for the most infiltration of runoff into the subsoil.

Thus, areas of a site with these soils should be conserved as much as possible and these areas should ideally be incorporated into undisturbed natural or open space areas.



**FOREST COVER** supports a community's quality of life by maintaining the proper functions of watersheds. Wooded areas support water quality, stream health and aquatic habitat and keep soils in place, reducing sediment.

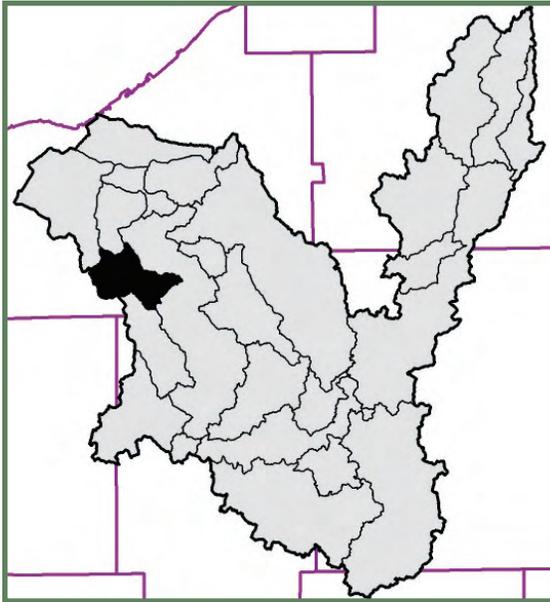
A healthy forest system can reduce communities' storm water infrastructure costs by intercepting rain, increasing ground absorption and slowing the rate of runoff. Other community benefits include: protecting drinking water supplies, enhancing property values and reducing household energy costs.

Communities need to develop forest cover programs that help maintain and restore tree cover to beneficial levels.



These watershed features reflect long-term geologic, climatic and vegetative patterns. They exist in the watershed to fulfill a specific need, and any disruption to this system often results in downstream costs. These impacts must be carefully balanced through mitigation or avoidance.

# CHIPPEWA CREEK WATERSHED CHARACTERISTICS

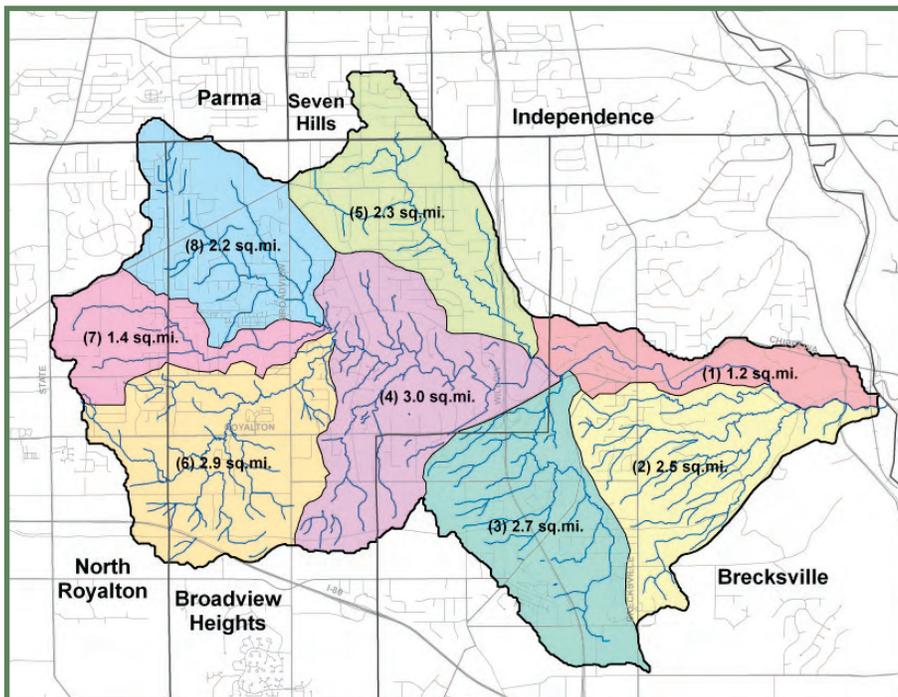


Chippewa Creek, located in Cuyahoga County, is an urbanizing watershed within the Cuyahoga River Area of Concern. Chippewa Creek represents one of the last remaining, relatively healthy subwatersheds in the Lower Cuyahoga River Watershed.

Chippewa Creek Watershed is approximately 17 square miles and drains portions of five communities, Brecksville, Broadview Heights, North Royalton, Seven Hills and Parma. Chippewa Creek stretches nearly eight miles, winds through suburban neighborhoods and before discharging into the Cuyahoga River, flows through the Cleveland Metroparks' Brecksville Reservation and the Cuyahoga Valley National Park.

Chippewa Creek has many of the problems an urbanizing watershed can have. Development in the past occurred with little regard to watershed functions. Building in wetlands and encroaching in floodplains with little or no storm water control has altered drainage patterns and the frequency and severity of flooding.

Approximately 26% of the watershed remains undeveloped and these areas are filled with critical natural features. The keys to restoring Chippewa Creek include properly conserving these natural resources as communities expand and enhancing and restoring areas that have been impacted in the past.



## CHIPPEWA CREEK SUBWATERSHEDS

Subwatershed is defined as a smaller subdivision of a watershed based on the flow of water, which generally corresponds to an area drained by a small tributary.

There are eight subwatersheds within the Chippewa Creek Watershed. Breaking watersheds down into smaller, more manageable units (i.e. subwatersheds) can be important for assessment, planning, identifying conservation, restoration and development options and implementation effectiveness.

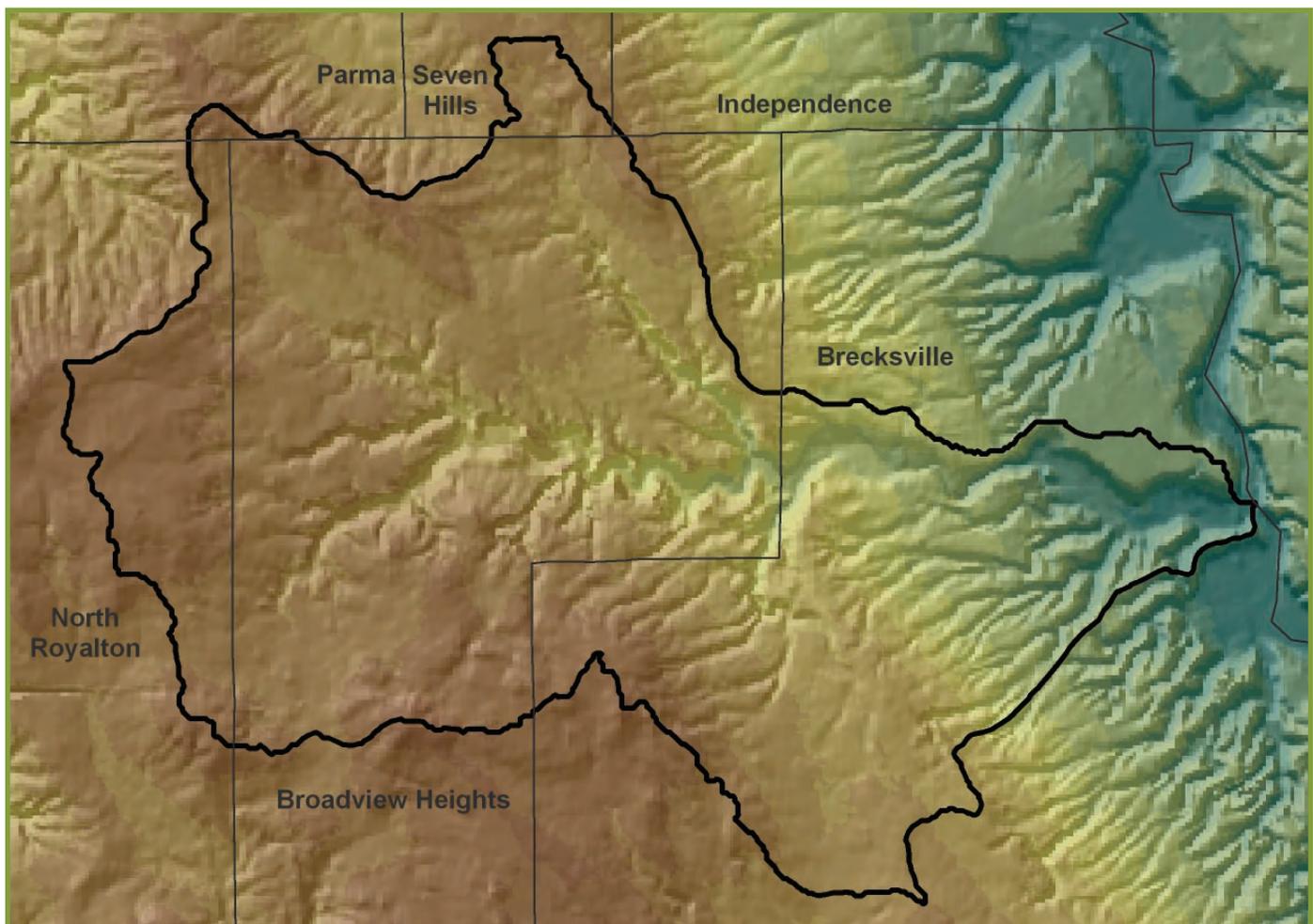
# Chippewa Creek Elevation

The watershed is characterized by rolling terrain generally sloped toward the Cuyahoga River with relatively deep ravines along downstream tributaries.

Topography ranges from an elevation of approximately 1,285 ft. in the southwest corner of the watershed to 630 ft. at the confluence of Chippewa Creek and the Cuyahoga River.

The average land surface slope in the watershed is 2.3 percent, which is steeper than most watersheds in the Cuyahoga River Watershed.

This relatively high slope in land surface has implications on the volume and velocity of stormwater runoff.



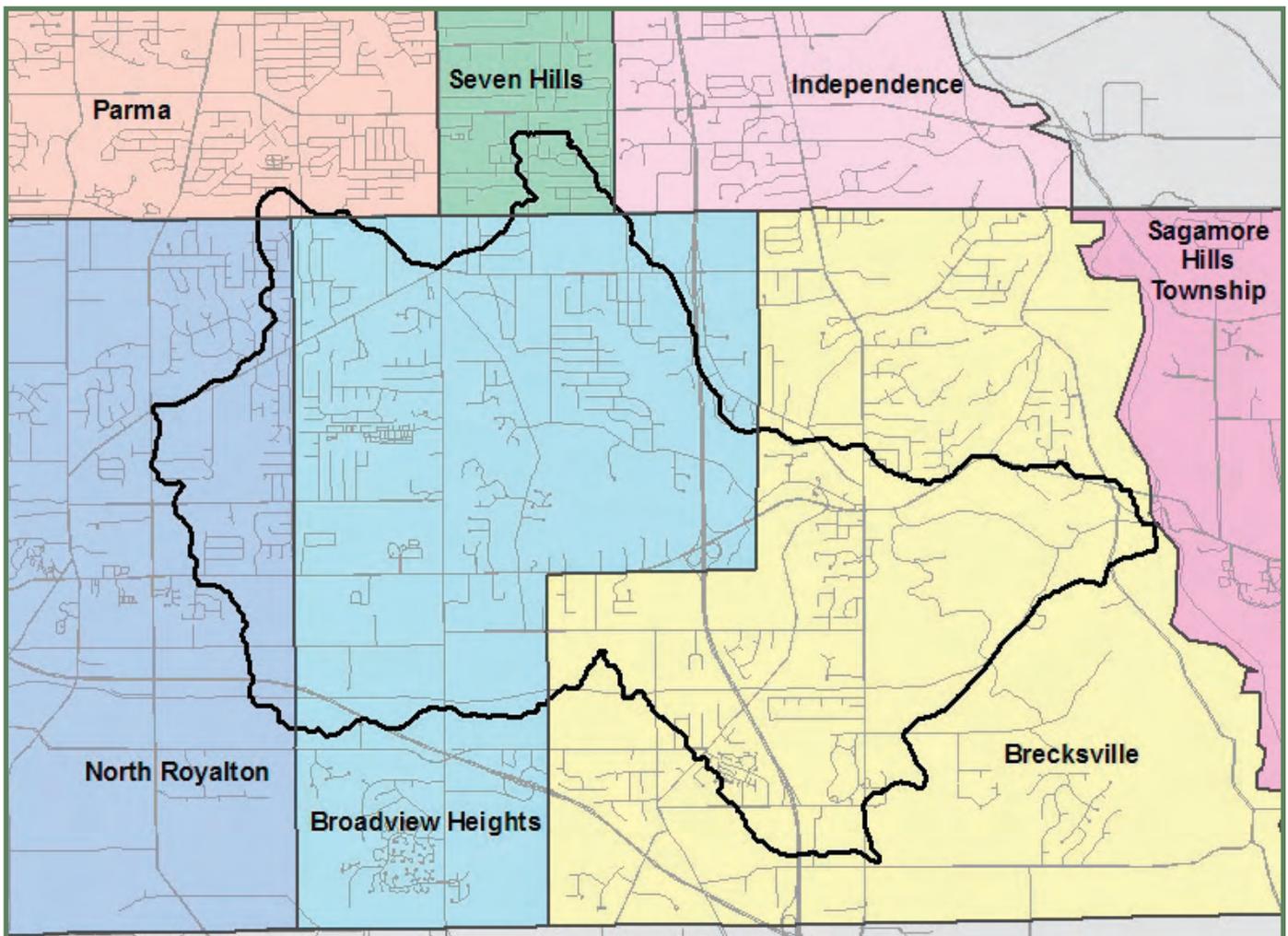
# Chippewa Creek Political Boundaries

## MUNICIPALITIES

- Brecksville
- Broadview Heights
- North Royalton
- Seven Hills
- Parma

## PARK DISTRICTS

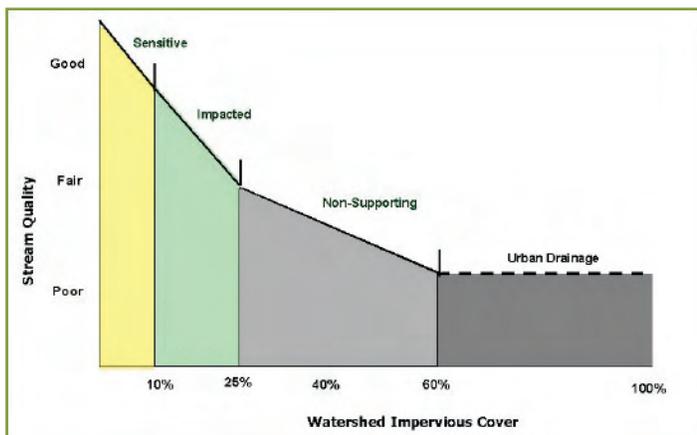
- Cleveland Metroparks
- Cuyahoga Valley National Park



# Chippewa Creek Impervious Cover and Watershed Quality

The most important hydrologic characteristic affecting storm water runoff is impervious cover. Impervious surfaces are hard surfaces (ex. roads, rooftops) that do not allow stormwater to infiltrate into the ground, causing the runoff to flow directly into drainage systems. The amount of imperviousness in a watershed correlates directly with frequent flooding and poor water quality. Highly urbanized areas, where much of the land surface has been either paved or covered with buildings, are considered highly impervious. Rural areas tend to have low imperviousness, in which case stormwater infiltration and runoff is controlled by the surrounding soil type.

Diagram: As impervious surface increases, stream quality decreases



## IMPERVIOUS COVER MODEL

The Center for Watershed Protection (CWP) has summarized research findings and created an Impervious Cover Model (ICM). The ICM predicts that most stream quality indicators show a decline as the total impervious cover within a watershed increases. (Source: Center for Watershed Protection)

Watershed Impervious Cover 0-10%- these streams usually sustain a high quality, and are often typified by stable channels and healthy biotic communities. The streams may not experience as frequent flash flooding as other urbanized streams.

Watershed Impervious Cover 11-25%- these streams are described as impacted and flooding will occur more frequently. Watershed urbanization may cause stream degradation and alter the stream geometry as a result of increased storm flow and erosion. Some sensitive species may also disappear from the stream.

Watershed Impervious Cover >25%- streams are described as damaged with more frequent flooding and poor water quality. This category of stream becomes unstable and experiences severe erosion and channel widening. Aquatic life becomes dominated by a small variety of pollution tolerant fish and insects.

## IMPERVIOUS COVER MAPPING

allows communities to gain an idea of how impacted their watersheds currently are, allows them the opportunity to evaluate potential impacts from future development and provides a means to make better-informed site-design decisions.

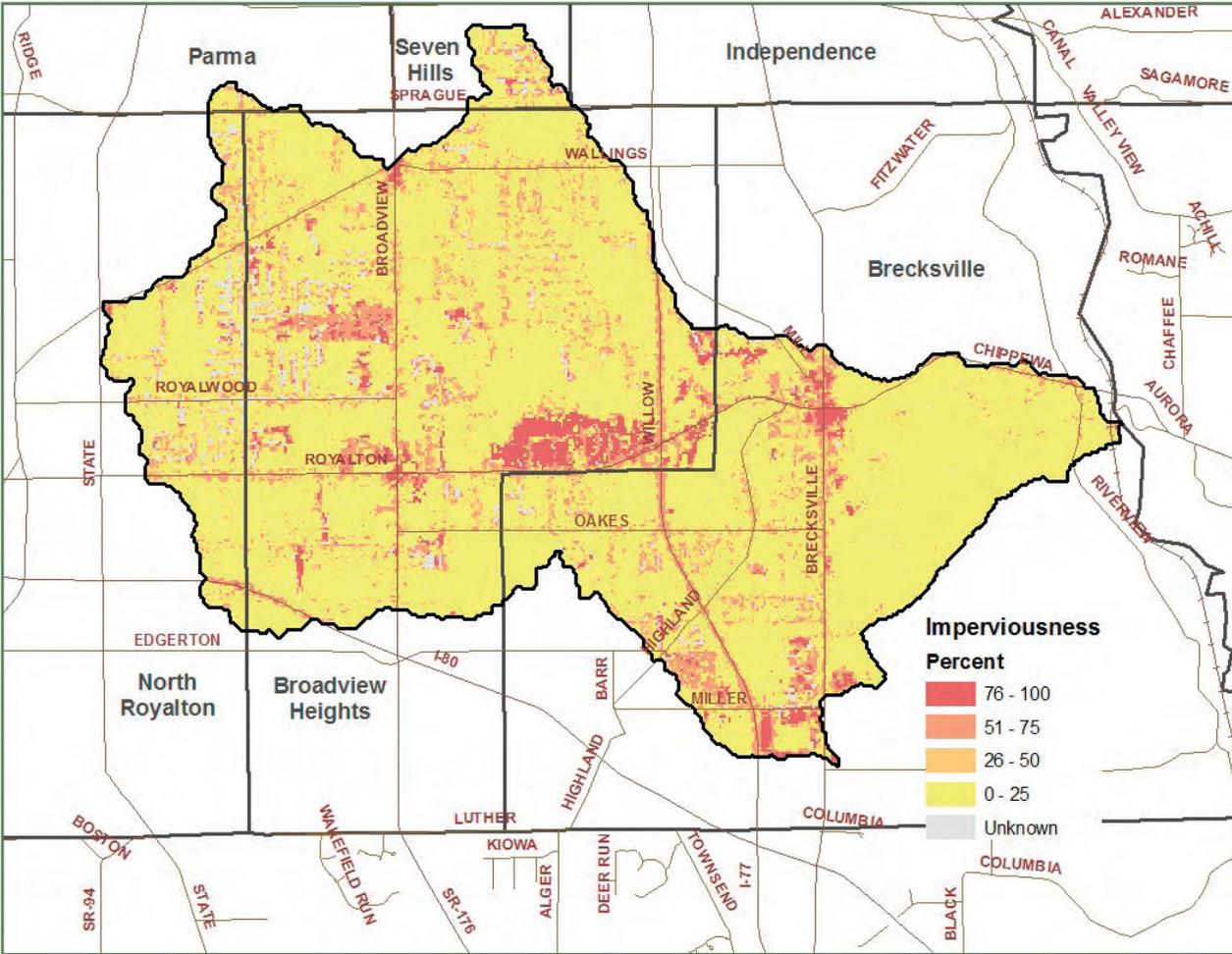
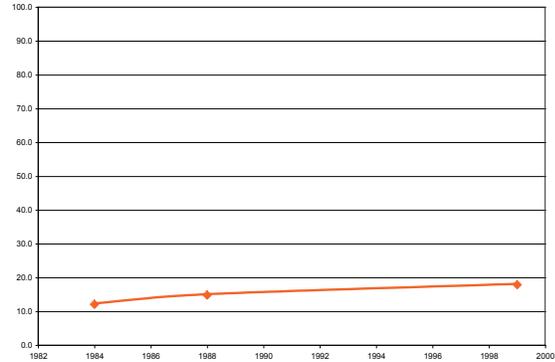
Understanding the link between impervious cover and watershed quality is essential for communities, organizations and agencies to appropriately deal with the issues of watershed and stream degradation now and in the future.

# Chippewa Creek Impervious Cover

Approximately 18% of the Chippewa Creek watershed is covered by impervious surfaces. Trends suggest that impervious cover has increased by 44% from 1984 to 1999. Many of these surfaces contain no stormwater management devices and directly drain and contribute excessive runoff to receiving streams, causing downstream flooding and property erosion.

Research indicates that 26% is the maximum percentage of impervious cover in which streams can still commonly meet aquatic life standards. However, when important watershed features exist, such as forested riparian corridors and influx of groundwater, streams may still meet attainment even at greater levels of urban land use. (Yoder et al., 2000)

Increase in Imperviousness, 1982 – 1999



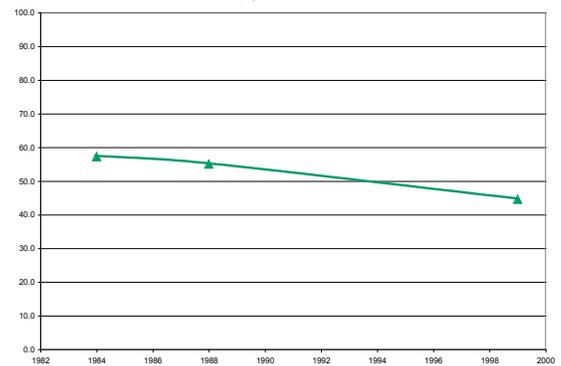
# Chippewa Creek Forest Canopy Cover

An important, yet often undervalued, resource in urban watershed management is forest canopy cover. A healthy forest system can save communities storm water infrastructure costs by intercepting rain, increasing ground absorption and slowing the rate of runoff. A strong correlation exists between the extent of forest canopy cover and the health and functioning of a watershed and its streams.

Data indicates that forest canopy in Chippewa Creek has decreased 23%. In 1984, the watershed contained 57% canopy coverage, but decreased to 44% in 1999. Future watershed management objectives include:

1. Working with the communities to develop target canopy cover goals that are appropriate for the level of development and for optimal watershed function;
2. Developing a tree canopy program that can be implemented by communities to preserve and restore canopy on public and private lands.

Decrease in Forest Canopy, 1982 – 1999



# Chippewa Creek Water Quality & Biological Integrity

The quality of water and the health of aquatic life in Chippewa Creek is a useful indicator of the collective land use conditions in the watershed. Problems with poor water quality or aquatic life do not simply originate from a factory effluent pipe. They originate with the way land is used throughout the watershed. The problems can often be initiated by the location of development (i.e. building in flood zones or riparian corridors) and the design of the development (development that creates large amounts of impervious cover and stormwater runoff).

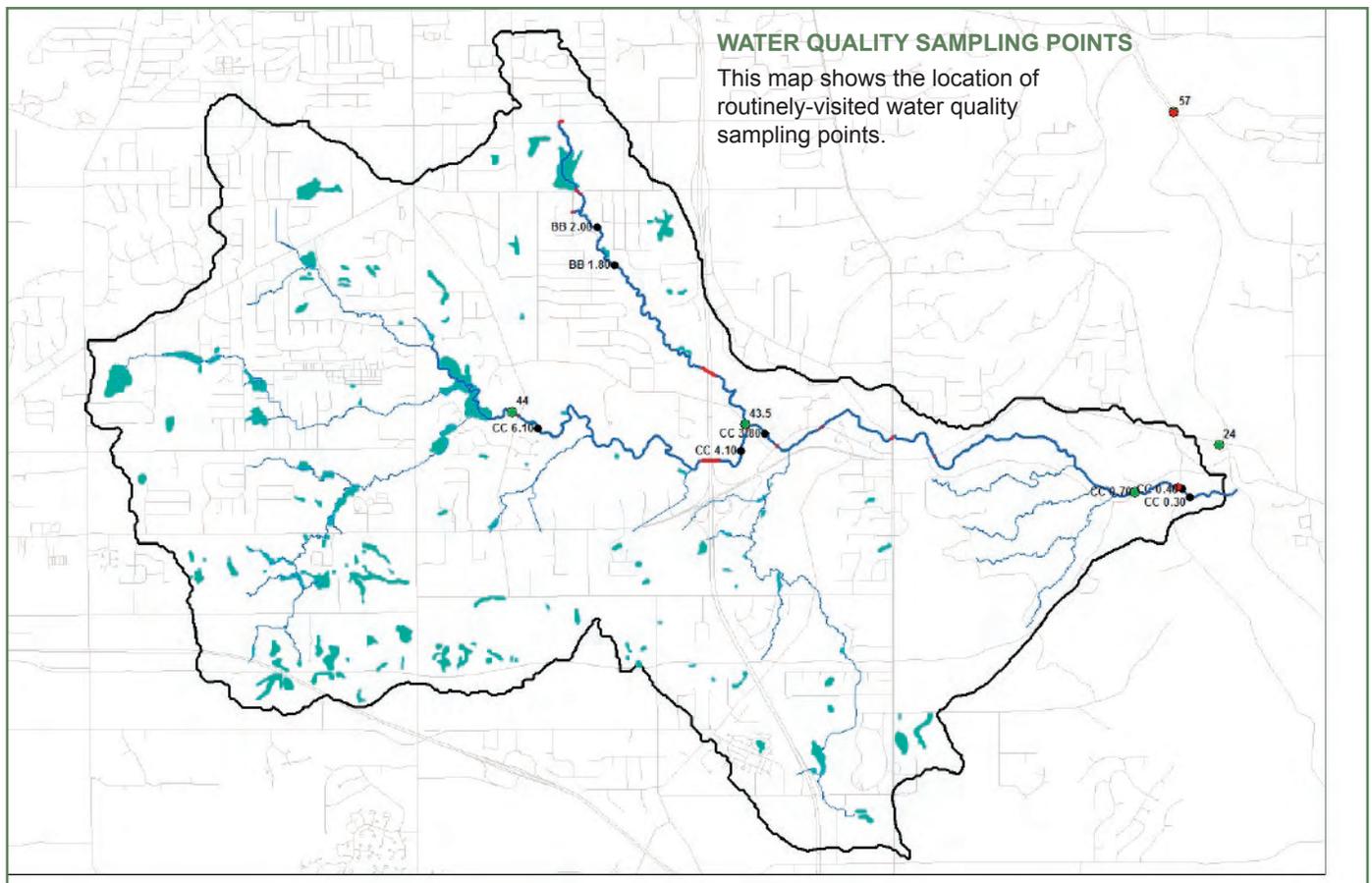
## USE ATTAINMENT IN CHIPPEWA CREEK

Chippewa Creek is designated by Ohio EPA as a “Warm Water Habitat”. This designation means that Chippewa Creek should be able to support a well-balanced population of fish and aquatic insects. Prior to the mid 1990s the entire stream was unhealthy and did not support balanced communities. Recent studies have shown the creek has improved.

The Lower Half of Chippewa Creek (from the City of Brecksville to the National Park) is healthy and in full attainment. The upper half lacks a healthy fish community and is therefore only in partial attainment.

Following Ohio EPA's last field assessment there have been numerous pollutant reduction efforts in Chippewa's upper watershed. Such efforts include the elimination of: inadequate wastewater treatment plants, failing home sewage treatment systems and leachate from the Norton landfill.

However, increased urbanization and resultant runoff continues to be a major pollution source that needs to be addressed throughout the creek.



# Chippewa Creek Fecal Bacteria

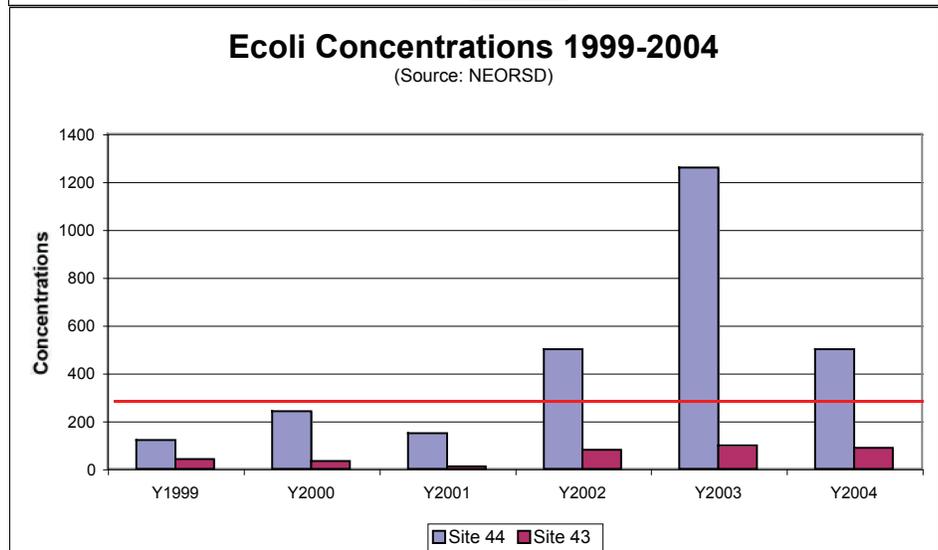
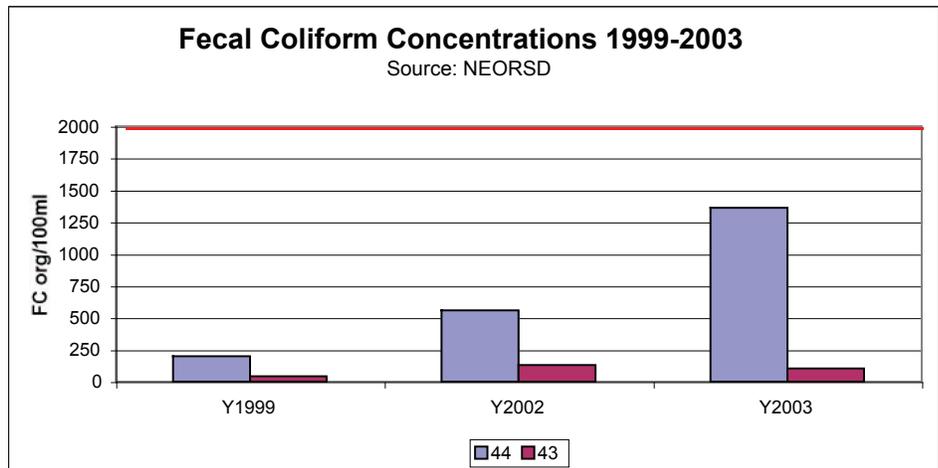
Fecal bacteria are microscopic organisms that are present in the intestine or feces of warm-blooded animals. They are often used as indicators of sewage contamination in streams. Chippewa Creek is monitored for fecal coliform and E. coli bacteria. Increased counts of these bacteria are often equated with increased risk of water-borne illness if a person were to come into contact with the untreated water. The bacteria and viruses of concern in urban streams can come from humans, wildlife, and household pets.

## FECAL BACTERIAL IN CHIPPEWA CREEK

In the past, Chippewa Creek suffered from elevated bacteria levels, making the water unsafe for human contact. Studies have shown that bacteria levels have improved overall, but in the past few years there has been a spike in concentrations.

From 1987 to 1991, harmful levels of bacteria (i.e. fecal coliform and e.coli) dropped considerably. The Northeast Ohio Regional Sewer District determined that the values declined corresponding to the closings of eight local wastewater treatment plants and the addition of sanitary sewers to the area.

However from 1999 to 2004, fecal bacteria levels were increasing. Fecal coliform and E.coli concentrations were elevated, particularly in the upper reaches of Chippewa Creek. In 2003, both fecal coliform and E.coli had concentrations well above water quality standards. The cause of the fecal bacteria increase has not been determined and more sampling is needed. A possible source could be an illicit sanitary connection entering the creek, which is a common problem throughout much of Northeast Ohio.



# Nutrients (Phosphorous and Nitrogen)

Nutrients are an essential component for both plant and animal life. Like most chemicals in nature, the problem in our streams is not the presences of nutrients, per se; rather it is too much nutrient entering the stream from our urban landscape.

Nutrients can exert negative impacts on stream quality when concentrations become elevated. Too great amount of nutrients can:

- Alter a stream's food chain by creating an environment that favors pollution tolerant organisms.
- Cause stream water to become cloudy from excessive algae growth. This affects the viability of both plants and fish.
- Decrease oxygen levels in the water which affect sensitive aquatic life

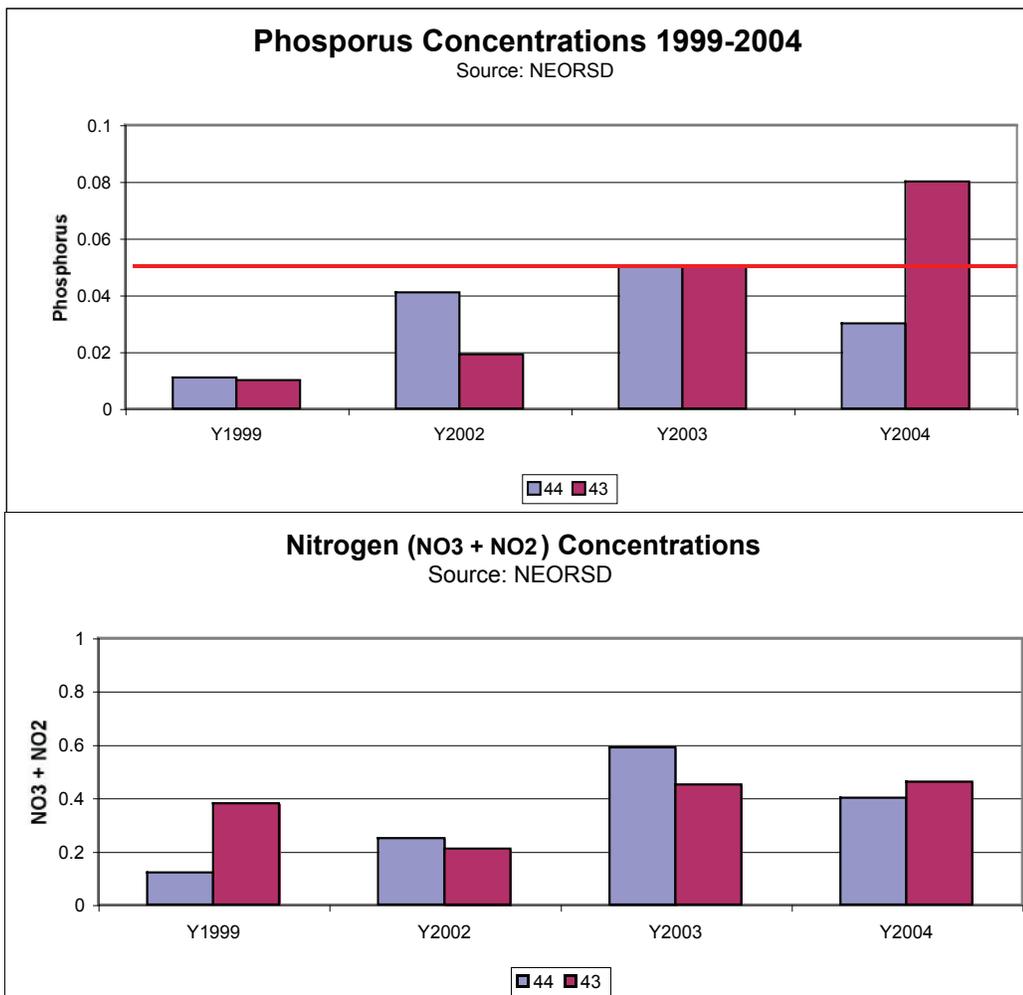
The 2003 Lower Cuyahoga River TMDL identifies phosphorus and nitrates-nitrites (a form of nitrogen) as two of several target pollutants that need to be addressed.

## NUTRIENTS IN CHIPPEWA CREEK

Nutrient levels have improved considerably since the mid 1990s. Chippewa used to endure excessive pollutant inputs from a waste water treatment plant, poor on-lot septic systems and leachate from the Norton landfill, but those sources have been alleviated. Any existing causes and sources of nutrient pollution are non-point in origin.

Currently, Ohio EPA still lists nutrients (and enrichment) as an issue. Signs of too much nutrients, such as excessive plant growth, was noted during assessments. With all the pollution reduction efforts, improvements in the creek's health are expected to continue. Additional sampling may be necessary to determine that nutrients are no longer a concern.

The most recent sampling data indicates that both phosphorus and nitrogen are at acceptable levels. In 2004, the lower reaches had elevated concentrations above the target levels.



# Chippewa Creek Aquatic Biology

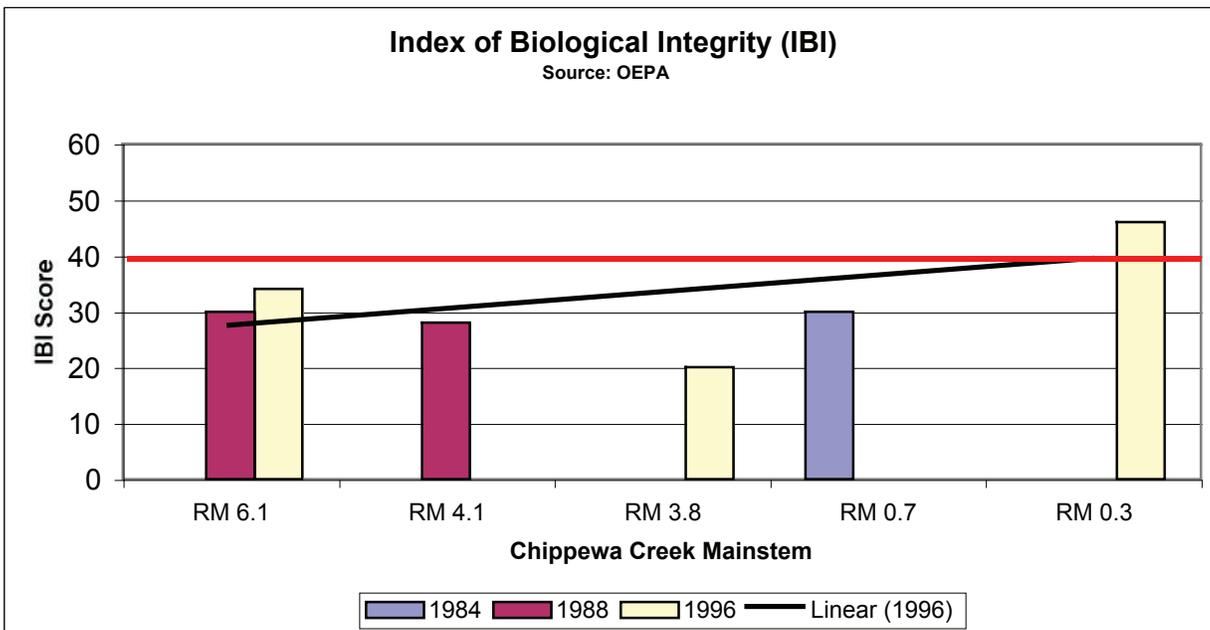
The upper and middle section of the creek, upstream from Brecksville, contains relatively unhealthy fish populations.

This can be attributed to polluted runoff from expanding suburban land use, sedimentation from under-managed construction activity and stream bank erosion from increased storm water runoff. Also, waterfalls in Chippewa Creek may inhibit upstream replenishment of fish populations.

As the creek moves into the Brecksville Reservation and the Cuyahoga Valley National Park the health of aquatic life substantially improves.

Both parks provide excellent Riparian zones, wetlands and cobbled substrates, which together provide a setting for aquatic communities to flourish. Fish and aquatic insect communities near the mouth of Chippewa have improved significantly since 1984.

Due to the pollution reduction stated above, Ohio EPA anticipates that Chippewa's upper reaches will show improvement during the next field assessment.



# Major Issues to Manage in the Chippewa Creek Watershed

- Managing a Flood Prone Watershed
- Addressing Remaining Large Land Tracts (or undeveloped sites)
- Increasing Urbanization
- Loss of Important Forest Canopy
- Critical Downstream Natural Resources
- Integrating BGI plans into local master plans and regulations

## Methodology

### DEVELOPING EVALUATION CRITERIA FOR PRIORITY CONSERVATION AREAS AND PRIORITY DEVELOPMENT AREAS

#### Overall Methodology Steps

1. Identify and Evaluate Community Issues and Desires (ie. frequent flooding etc.)
2. GIS Data Analysis of Chippewa's Natural Features
3. Qualitative Assignment of Natural Features: Reflect Community Needs & Watershed Function
4. Identify Undeveloped Land with Relation to Natural Features
5. Priority Conservation Areas & Priority Development Areas

The Chippewa Creek Balanced Growth Plan has been developed to provide a proactive approach to managing development and ensuring the protection of natural resources and watershed function. The Plan provides guidance on which land is suitable for development and conservation as well as, how such land can be preserved and protected.

The process to identify Priority Conservation Areas (PCAs) and Priority Development Areas (PDAs) began with identifying community needs and incorporating these ideas into the planning process.

Numerous Watershed Planning Partnership meetings were held throughout the planning process. We solicited feedback from the partnership to help shape the evaluation criteria for identifying conservation and development areas.

Each community representative received a scoring priority worksheet titled "Scoring Priorities for Conservation of Important Watershed Features". The worksheet listed watershed features and their associated function and each person was asked to rank the importance of each item.

# Chippewa Creek

## Step I: Identify and Evaluate Community Issues

Table #1 includes the list of items and shows the scoring results. The survey determined, by the frequency of responses, which factors mattered most to the communities. The top scoring watershed features and issues will be used to identify areas of the watershed that should be pursued for conservation and conversely, areas without these characteristics should be more suitable for development.

Table 1: Chippewa Creek Scoring Priorities for Conservation of Important Watershed Features (PCA methodology)

<b>Features / Scoring Priority</b>	<b>Totals (Possible 42pts)</b>	<b>%</b>
Areas in imminent danger of property damage or loss	42	100
Floodplains for flood water management purposes	41	98
Wetlands for flood water management	39	93
Small streams and primary headwater areas for flow management	37	88
Steep slopes for erosion protection	37	88
Forest Corridors for flow and bank stability purposes	36	86
Wetlands for water quality and filtering	34	81
Stream banks and corridors for sediment prevention	33	79
Forest Areas which provide significant habitat / connections	32	76
Areas w/ potential for greenspace connections & trails	30	71
Areas that provide multiple functions and benefits	30	71
Wetlands for habitat enrichment	30	71
Areas adjacent or in close proximity to Metroparks / CVNP	28	66
Stream banks for habitat benefit	27	64
Floodplains for open space / park purposes	24	57
Large land tracts for significant vistas / greenspace	24	57
Forest areas which provide vistas	19	45
Steep slopes for vistas	15	36
<i>Other watershed features</i>		
Potential Retention / Detention Basins	9	
Stream Clearance	3	
Areas of high restoration value (filled wetland / channelized streams)	3	
Land fill reclamation to absorb storm water	3	
Stream debris removal	3	
Forest Canopy	3	
Runoff management	3	

The results of scoring priorities identified floodwater management as the most important issue for the watershed planning process. The second most important issue was erosion control, followed by forest cover and forested stream corridors. These priorities were helpful in providing a focus and, in turn, were used to identify priority conservation areas.

## Step 2: GIS Data Analysis of Chippewa Creek Natural Features

The process for developing evaluation criteria to identify priority conservation and development areas in the Chippewa Creek Watershed was a necessary first step in creating the balanced growth plan. Based on the results of the scoring priorities, a Geographical Information Systems (GIS) approach was used to identify watershed characteristics that best reflected the community's needs.

### GIS ANALYSIS

Geographical Information Systems (GIS) are some of the most comprehensive tools available for watershed and land use planning. The implementation of GIS can not only reduce time needed for analyzing information about a watershed, but can also ensure a more efficient use of resources. GIS enables users to display large amounts of data graphically to greatly enhance interpretation and analysis.

The Chippewa Creek planning process included numerous data layers from the most current available data sources to map existing landscape features, both natural and manmade. This provides a starting point from which to formulate future land use scenarios.

## Step 3: Qualitative Assignment of Natural Features Reflect Community Needs & Watershed Function

The key resource data layers were identified and run through a qualitative analysis. Resource layers were measured based on their importance to watershed function and how they matched up to the local community needs (see Table #2 Qualitative Criteria Focus). A qualitative assignment was necessary to prioritize the environmentally sensitive areas in the planning area for their value in maintaining a healthy watershed and to begin to recognize degrees of sensitivity as they relate to proposed future land uses.

Table 2: Qualitative Criteria Focus

1. Water Quantity Management
  - Stormwater & Flood Management
2. Soil Conservation
  - Minimize Erosion
3. Optimizing Green Infrastructure Services
  - Use the natural resources of the watershed to provide storm water services

### Key Natural Resource GIS Data Layers

- A. Soils-
  - Infiltration Rate
  - Drainage Rate
  - Hydric
  - Erodibility
- B. Steep Slopes
  - Slopes > or = 12%
- C. Streams
  - Headwaters Streams
  - Primary Headwater Streams
- D. Floodplains
  - 100 year flood zone
  - 500 year flood zone
- E. Riparian Corridors
  - 75 ft. width
  - 25 ft. width
- F. Wetlands
- G. Forest Cover
  - Forested Areas (dominated by trees).  
2002 orthophotos by CVNP

## Natural Feature: Critical Soils

The composition and characteristics of soils within a watershed are important for their potential impacts on water quality.

Soil properties related to this are

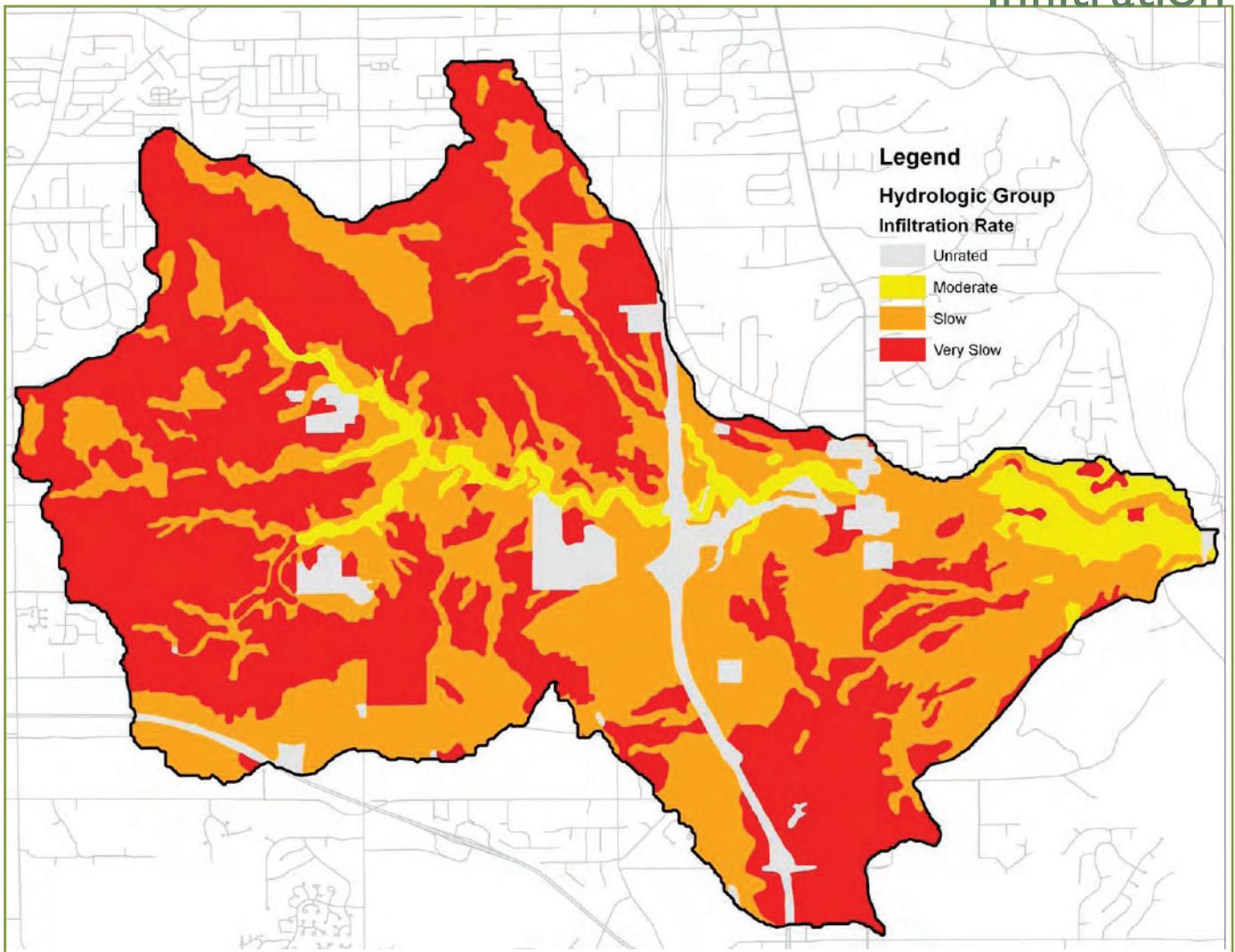
- the ability to store nutrients essential to plant growth,
- erosion potential,
- permeability, which is the soil's ability to allow precipitation to percolate into the ground and become part of the groundwater system, and
- hydric value.

**Soil Infiltration Rate:** Rate at which water penetrates the surface of the soil at any given instant. The rate at which infiltration takes place, usually in inches per hour, can be limited by infiltration capacity of the soil.

**Infiltration Parameters:** Unrated / Moderate / Slow / Very Slow

Moderate soil infiltration rate was selected. Areas that contain these soil conditions help absorb stormwater more quickly and thereby minimize runoff and erosion rates downstream. These are "working soils" which are providing a valuable function to the communities.

## Infiltration



# Chippewa Creek

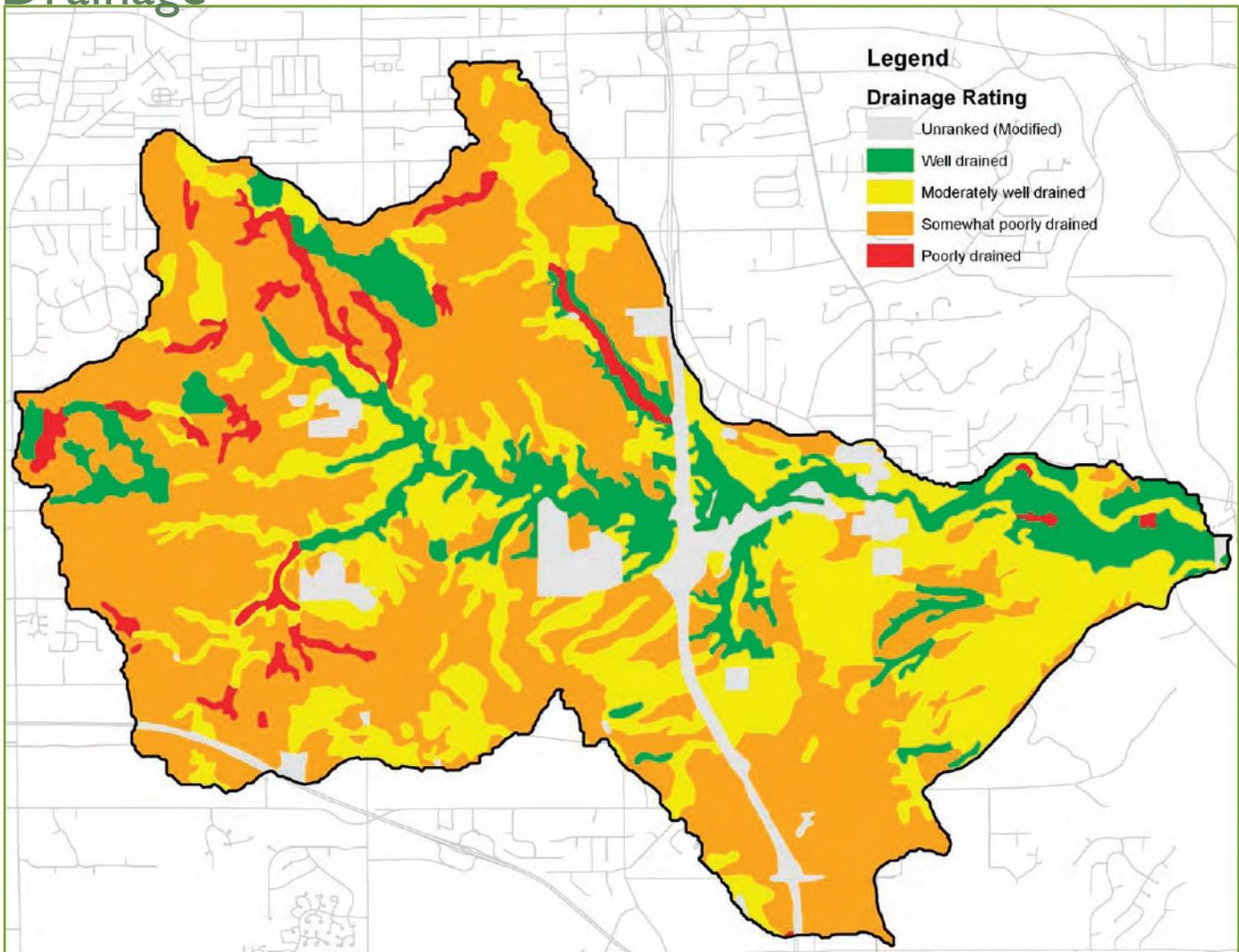
## Natural Feature: Critical Soils

**Soil Drainage Rate:** The relative terms used to describe the rate at which precipitation moves through the soil and into ground sources. The difference between drainage versus infiltration is that drainage measures the rate at which water passes through the soil, while infiltration measures the rate at which water first enters the soil.

**Drainage Parameters:** Modified / Well Drained / Moderately Drained / Somewhat Poor Drained / Poorly Drained

Well drained soils were selected. Areas that contain these soil conditions reduce runoff rates by allowing stormwater to filter into groundwater supplies. The groundwater is then slowly released into the streams. These are also “working soils” which are providing a valuable function to the communities.

## Drainage



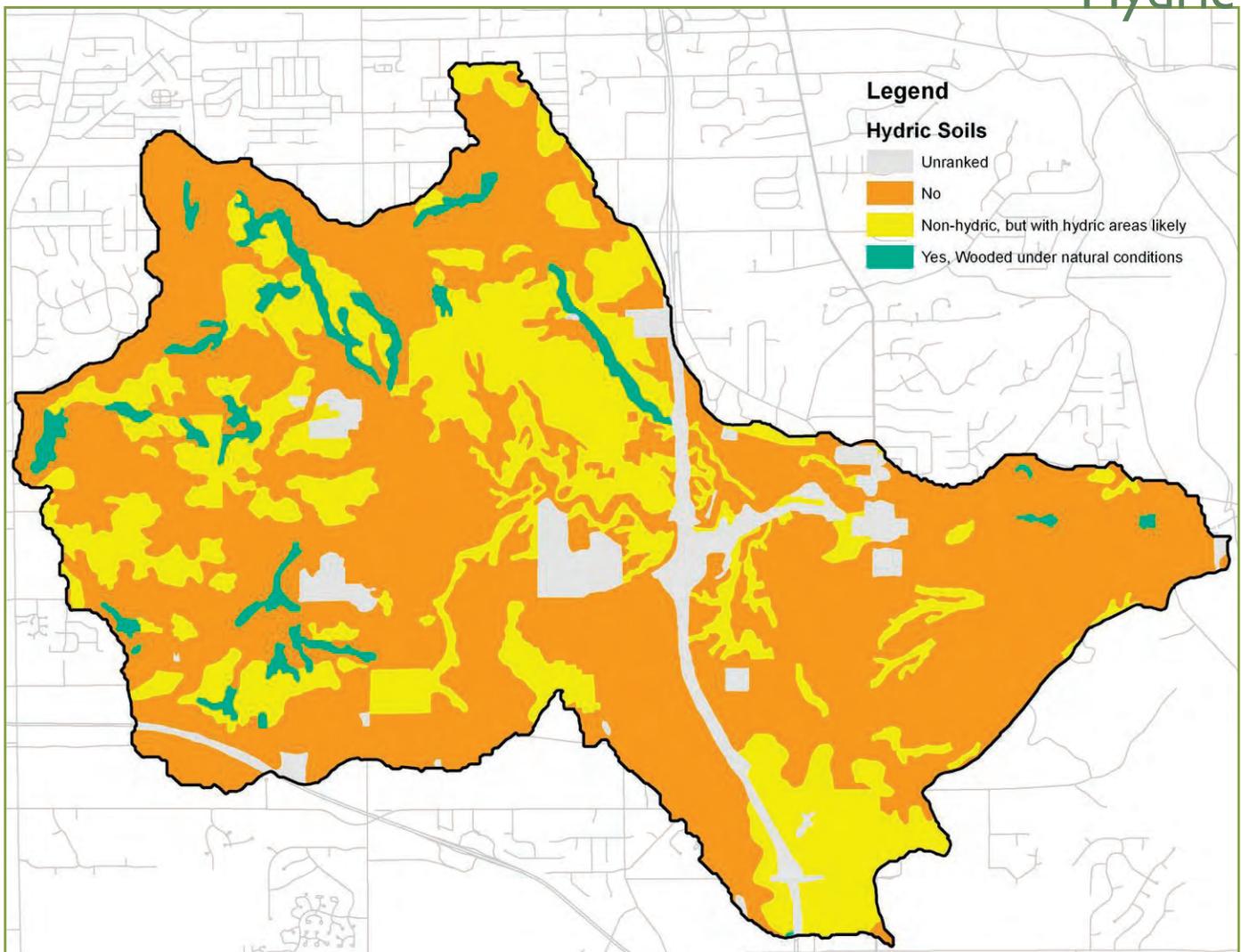
# Natural Feature: Critical Soils

**Hydric Soils:** Hydric soils are typically associated with the presence wetland sites. Hydric soils are those that are typically found in wet or saturated environments, such as the edges of streams and rivers, or in wetlands. They support hydrophytic, or water-adapted plant life that helps with sediment deposition and minimizes further erosion.

**Hydric Parameters:** Unranked / No / Non- Hydric (with likely hydric areas) / Yes- hydric

Hydric soils were selected. Areas that contain these soil conditions provide a valuable function to the communities. Hydric soils (with associated wetlands) are small drainage basins that draw and retain stormwater. These wetland areas manage the volume and energy of stormwater, filter and improve water quality and provide important ecological biodiversity.

## Hydric

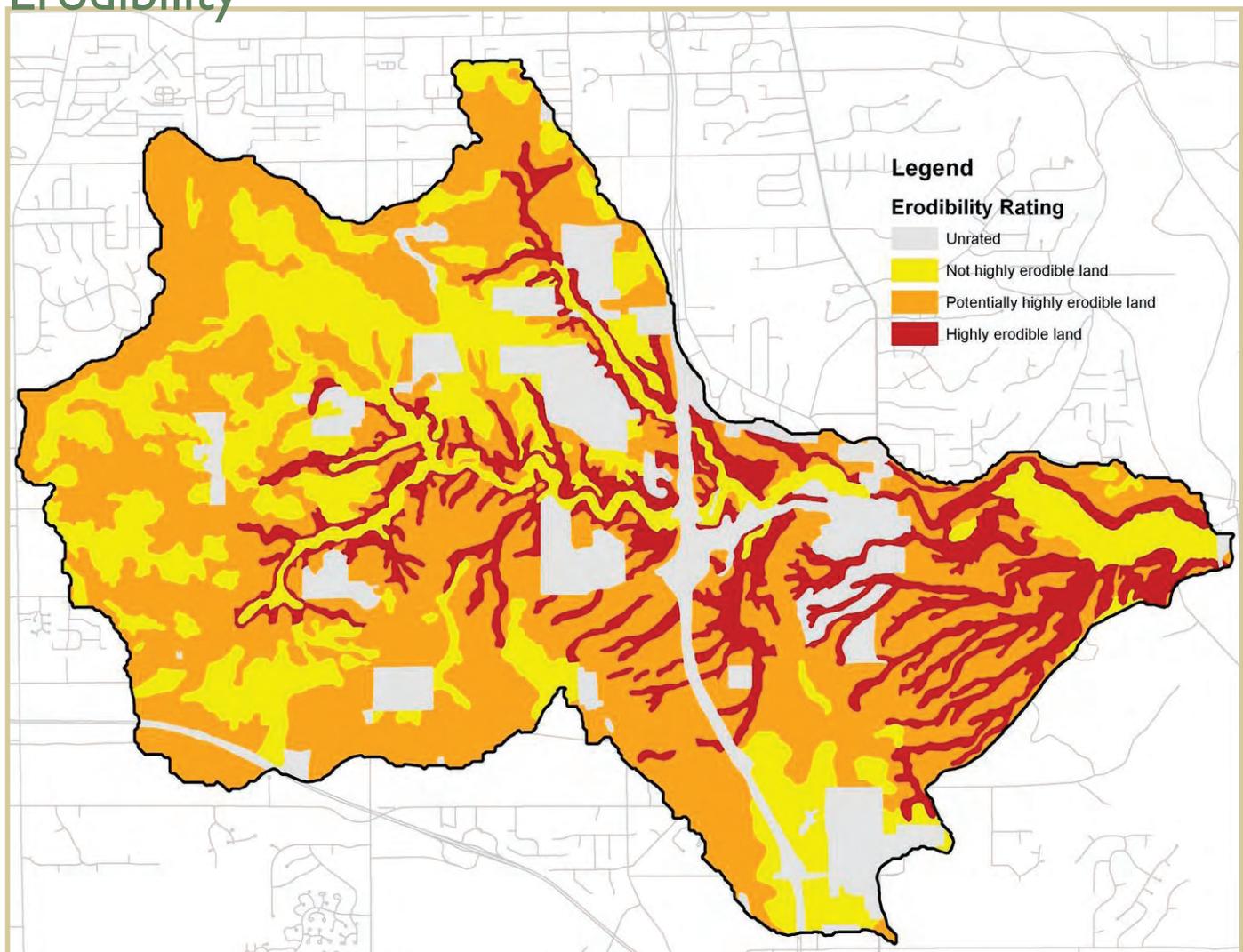


# Chippewa Creek Natural Feature: Critical Soils

Erodibility: indicates the susceptibility of a soil to erosion by water. Soil erodibility is determined by combining the effects of soil type, % slope, and susceptibility to erosion due to loss of vegetative cover. An erodibility index has been developed characterizing soils with “low”, “medium” and “high” susceptibility to erosion.

Erodibility Parameters: Low Susceptibility / Medium Susceptibility / High Susceptibility

## Erodibility

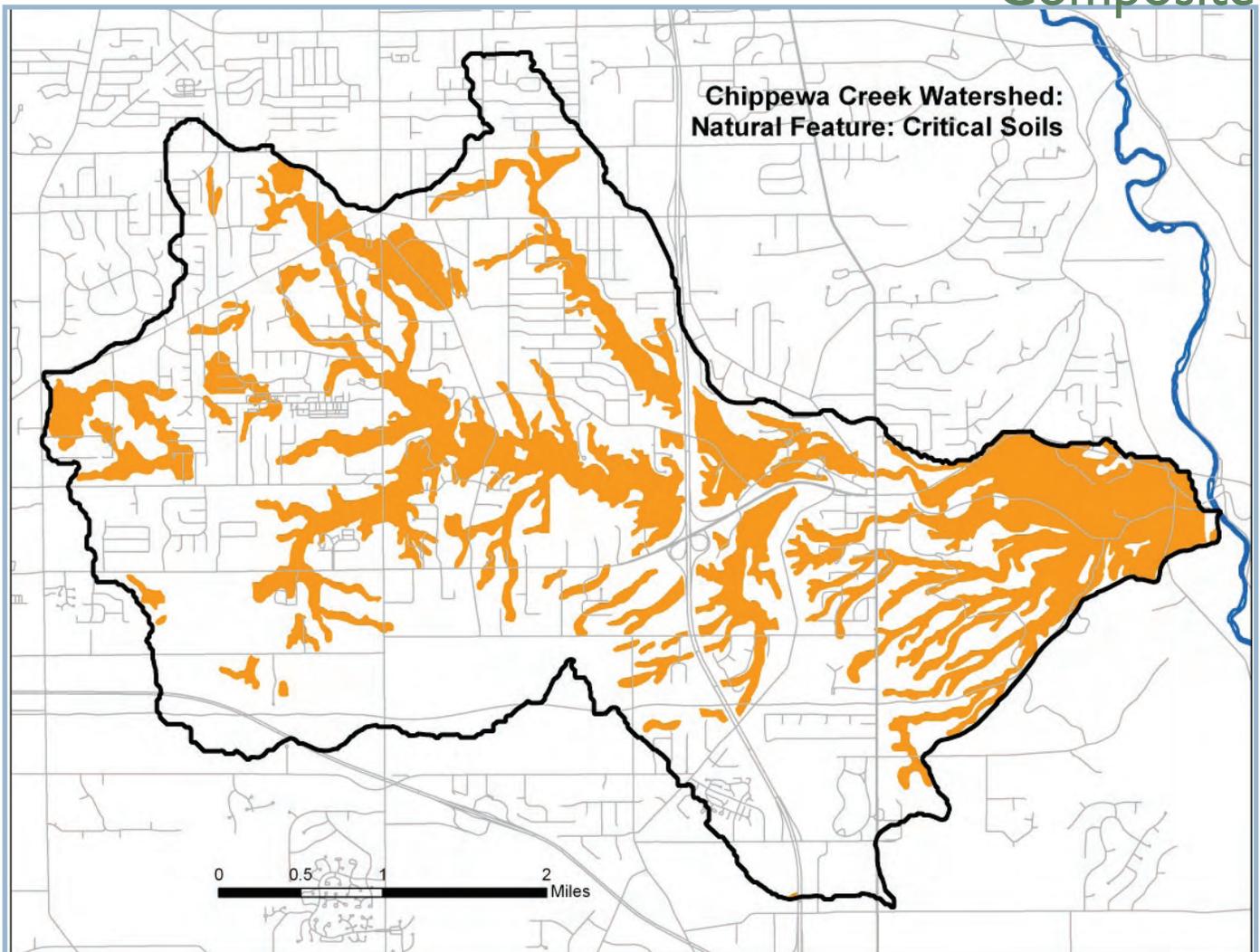


# Natural Feature: Critical Soils

A composite soil map was created to represent all selected parameters discussed previously. The composite soil map includes:

- Moderate Infiltration,
- Well Drained,
- Hydric Soils and
- Erodibility

Composite



# Chippewa Creek

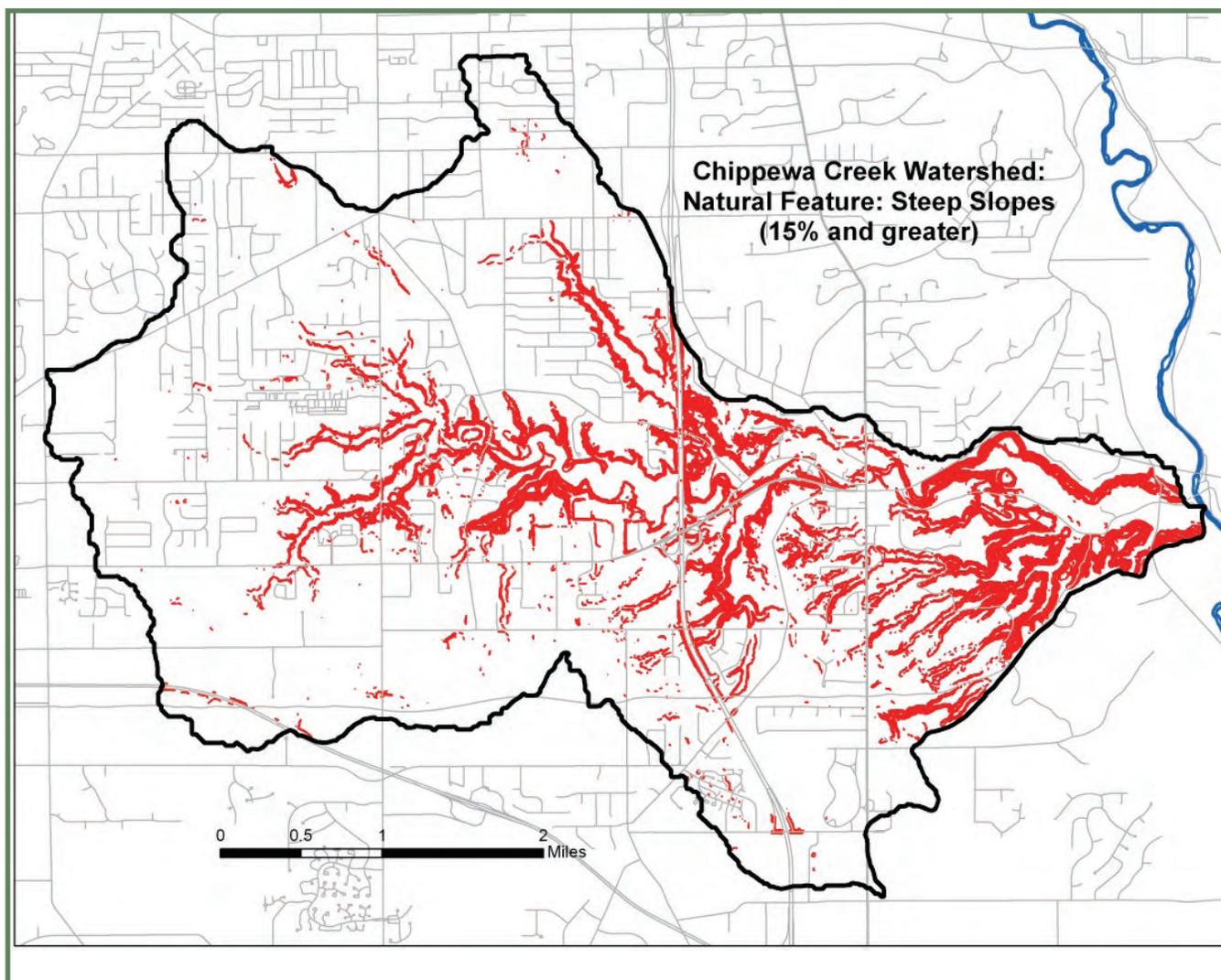
## Natural Feature: Steep Slopes

Slopes vary greatly within the Chippewa Creek Watershed. They range from steep gorge areas where the creek has cut its way down through the bedrock, to gentle slopes and flat areas. Slopes are mapped using a scale that ranges from flat to steep. For our analysis, we identified the steep sloped areas that could contribute to higher erosion potential and offer the most value for sensitive lands and habitat.

Slopes with a grade of 15% or more are considered steep slopes. Vegetated steep slopes provide an important resource to be preserved because any significant disturbance to the hillside's environment may result in: landslides or land instability, unacceptable alteration in the drainage patterns and loss of scenic value all of which pose risks to local property owners.

Slope Parameters: 0-5%, >5-10%, >10-15%, >15-20%, >20-25%, Over 25%

Steep slopes with grade of 12% or more were selected. The need to protect these slopes is based on percent and length of slope, the fact that soils in these areas are often easily erodible, and that other important natural resources (ex. streams and wetlands) can be in close proximity.



# Natural Feature: Streams

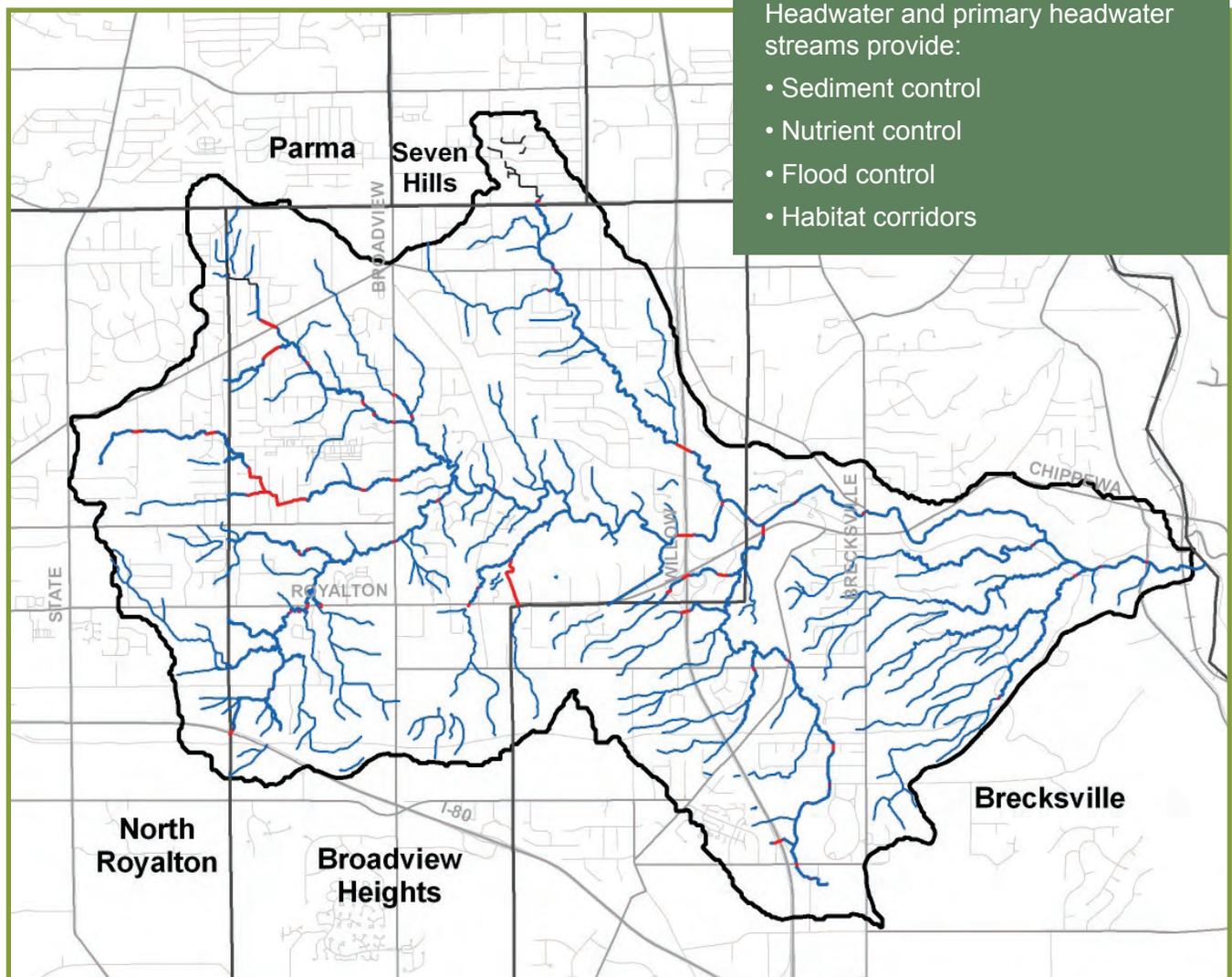
Streams are the conduits that receive, manage and distribute water. The communities within a watershed drain to a network of streams that transport water through the system, from small streams to larger rivers and eventually to a lake. Water in Chippewa Creek flows into the Cuyahoga River and finally reaches and discharges into Lake Erie.

## STREAM ORDER

For our analysis, streams with their associated sub-watershed were identified and sorted into two primary groups: Streams that have a drainage area of approximately 0.5-20sq miles and streams that drain approximately <0.5 sq. miles. The streams were organized in this manner to help determine riparian width size.

**Headwater Streams-** Streams that drain a watershed of 20 sq. miles or less are called headwater streams. These are the creeks and streams that feed larger rivers. These small streams join together to form larger streams and rivers or run directly into larger streams and lakes. Chippewa Creek, by definition, is a headwater to the Cuyahoga River. When headwater streams become damaged or impaired, the larger, downstream river will suffer as well.

**Primary Headwaters Streams-** Streams that drain a watershed less than 1sq. mile are called primary headwater streams. Every stream begins somewhere. That somewhere is its primary headwaters. Primary headwater streams are like the capillary system of a blood supply network- just as the health of the whole organism depends upon a functioning capillary system, the health of larger streams and rivers depend upon an intact primary headwater stream network.



# Chippewa Creek

## Natural Feature: Floodplains

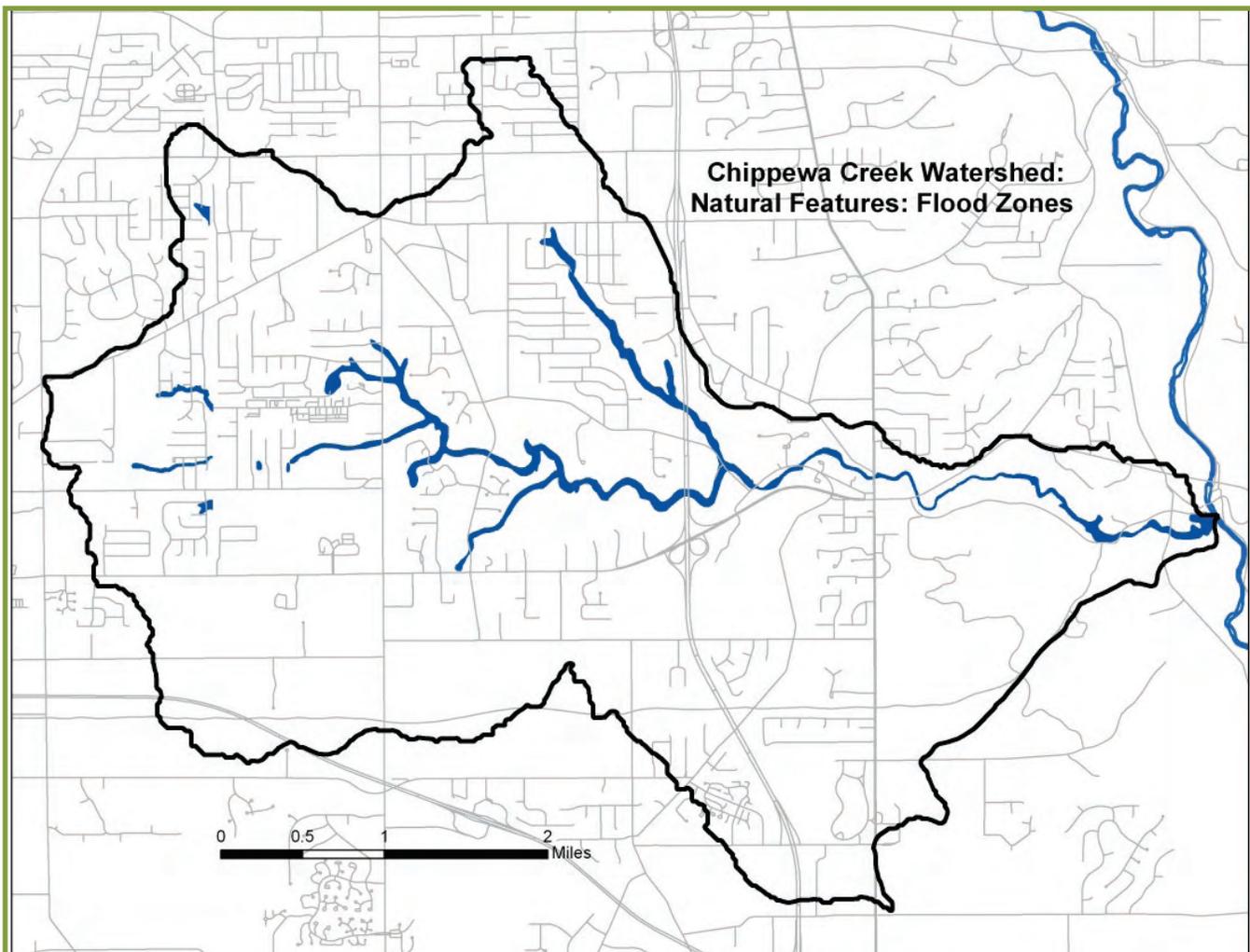
Floodplains are the low-lying flat lands that border streams and rivers. When a stream reaches its capacity and overflows its channel after storm events, the floodplain provides land area for temporary storage and conveyance of these excess flows.

These overflow areas outside the channel reduce the volume and energy of storm flows within the channel, which helps to minimize downstream property damage. Floodplains enhance biological productivity by supporting a high rate of plant growth. Floodplains provide excellent habitats for fish and wildlife by serving as breeding and feeding grounds.

For our analysis, the 100 year and 500 year floodplain was identified.

**100 Year Flood Plain:** An area of land that would be inundated by a flood having a 1% chance of occurring in any given year – also referred to as the 100 year flood. A 100 year flood is calculated to be the level of flood water expected to be equaled or exceeded at least once in a 100-year period.

**500 Year Flood Plain:** An area of land that would be inundated by a flood having a 0.2% chance of occurring in any given year – also referred to as the 500-year flood. A 500 year flood is calculated to be the level of flood water expected to be equaled or exceeded at least once in a 500-year period.



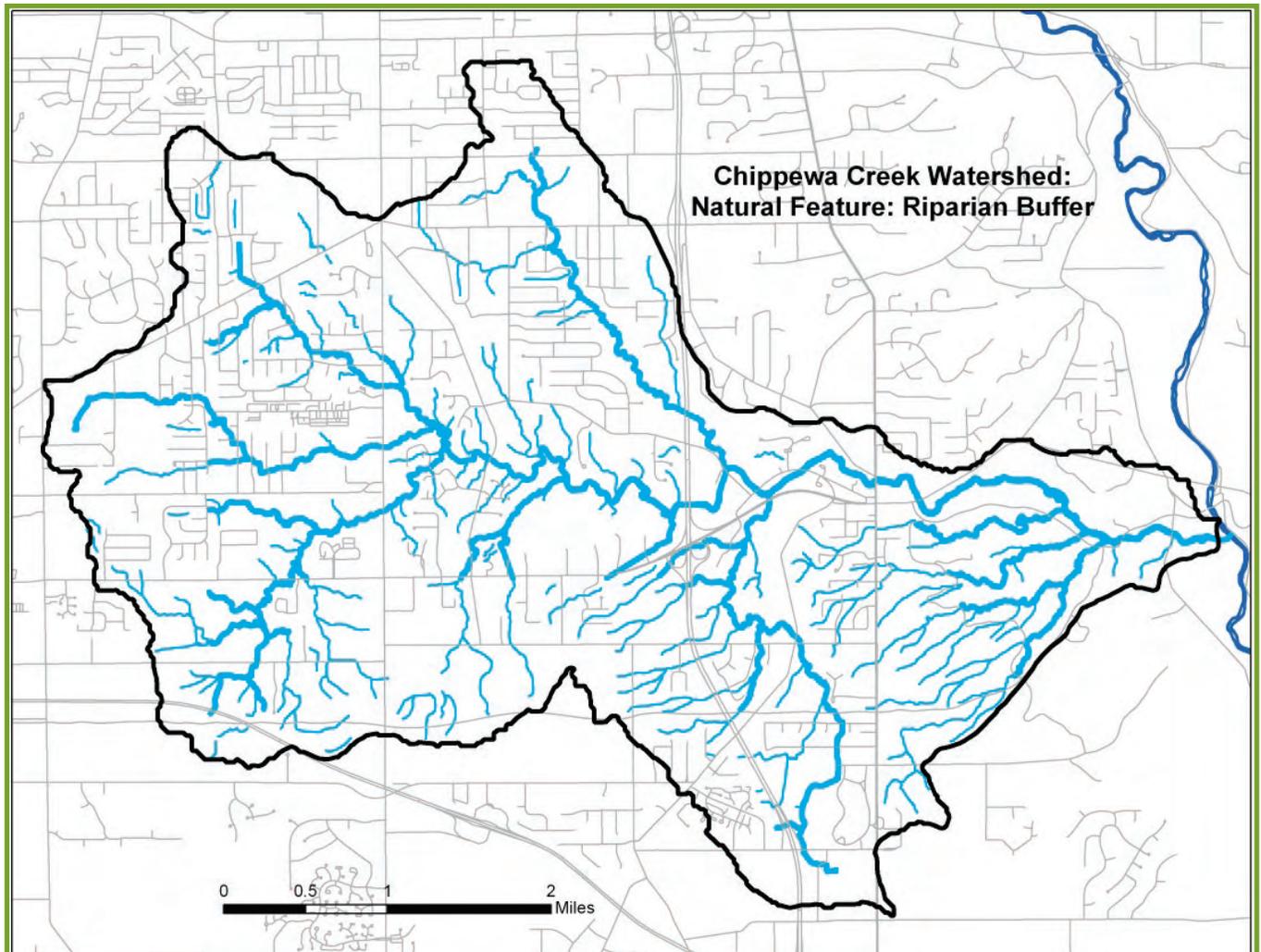
# Natural Feature: Riparian Corridors

Riparian corridors are the lands along the banks of rivers and creeks that separate the water from the surrounding landscape. These corridors stretch from the stream's primary headwaters to its mouth and are directly influenced by flowing water. Riparian corridors, when appropriately sized and well-vegetated, maintain healthy streams and aquatic life.

For the riparian corridor analysis, stream drainage areas of 0.5-20 sq. miles and <0.5 sq. miles were incorporated to determine riparian width. Recommended riparian corridor setback distances are based on the analysis of scientific studies that indicate the minimum setbacks required to maintain the functioning of riparian areas. These distances change as streams and their drainage areas get larger.

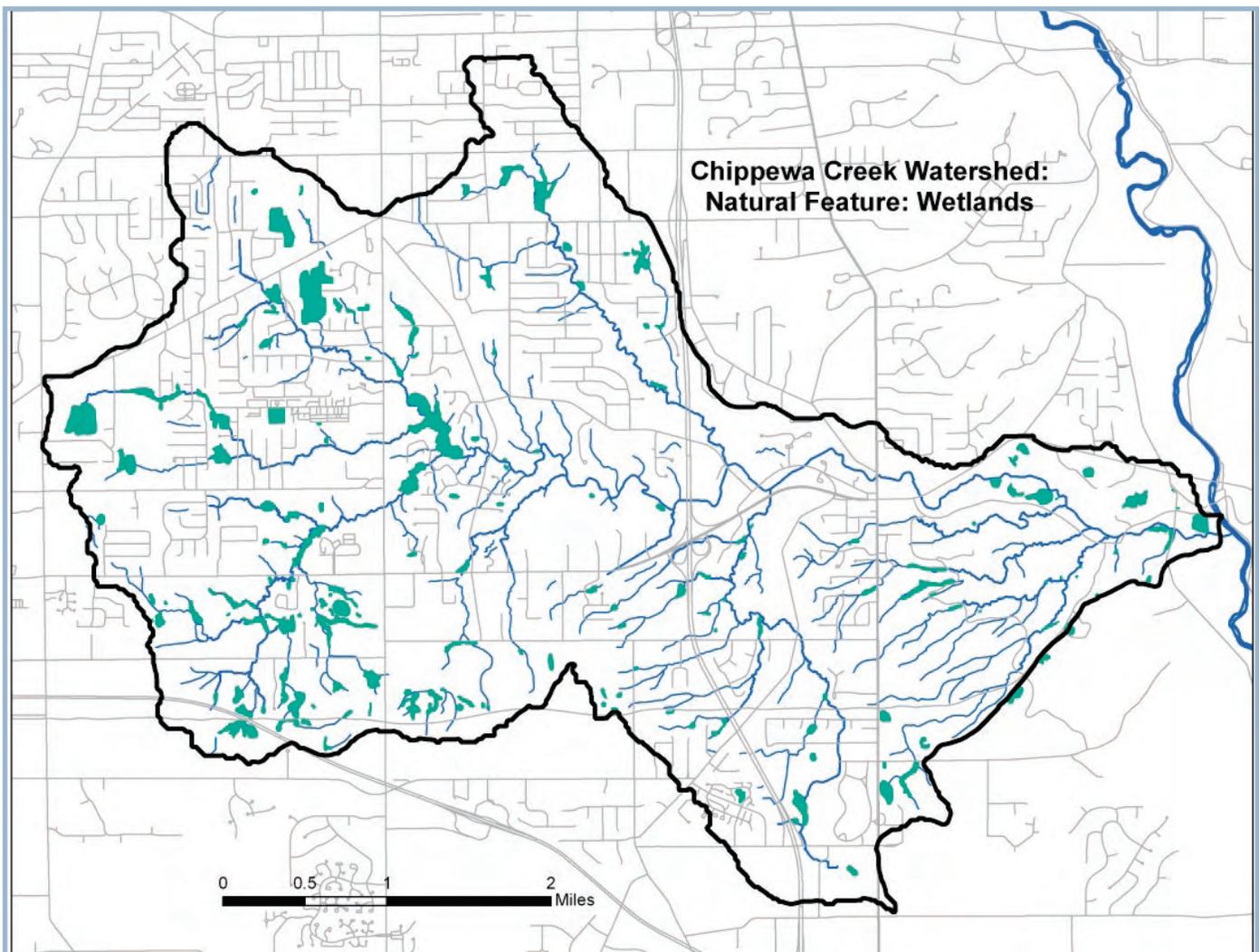
A 75 ft. riparian setback is recommended for streams that have a drainage area of 0.5-20 sq. miles

A 25 ft. riparian setback is recommended for streams that have a drainage area of <0.5 sq. miles



# Chippewa Creek Natural Feature: Wetlands

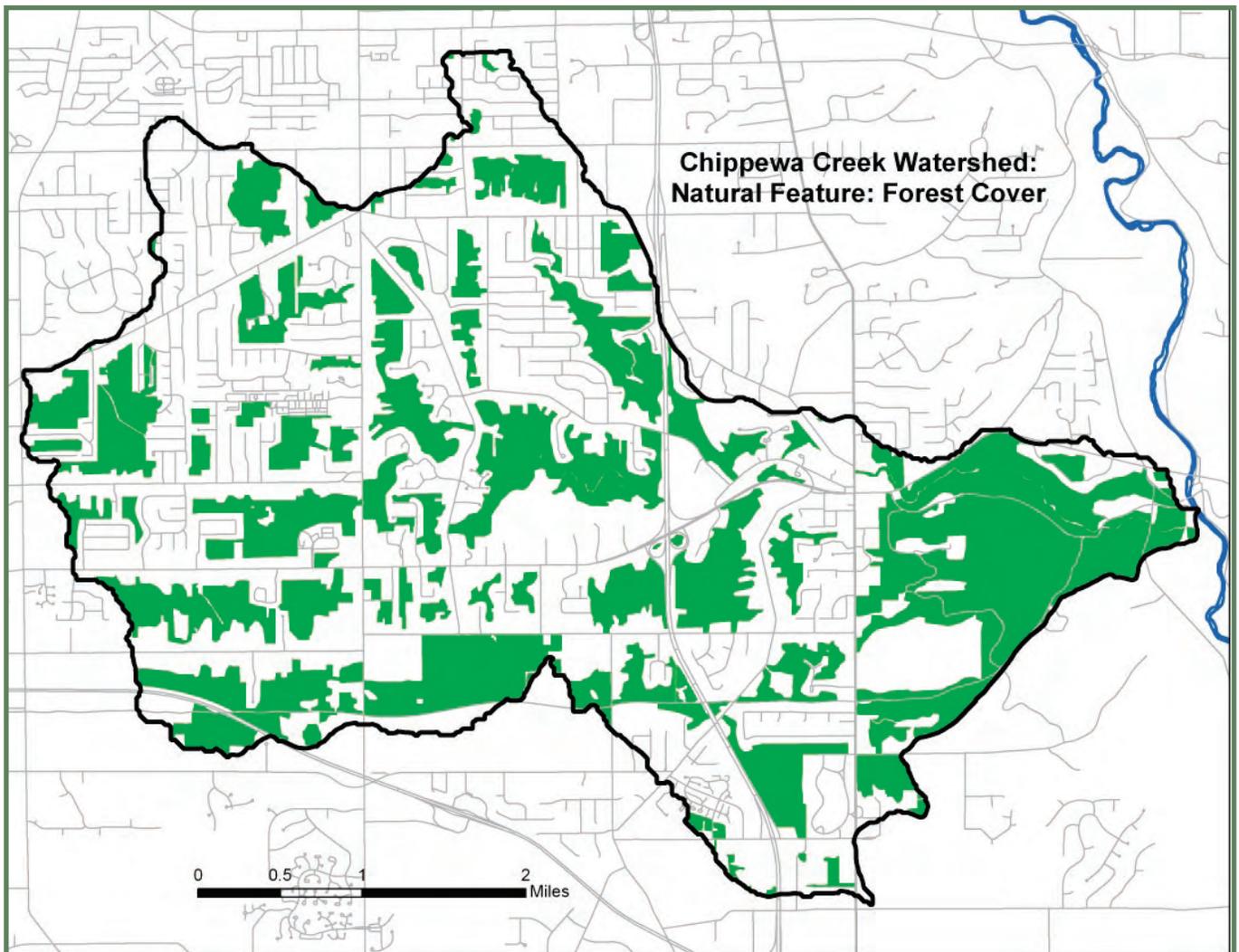
Wetlands within a watershed serve several purposes that are important to the overall health and function of the watershed system. Wetlands provide for flood water storage- that is, they provide a place for runoff and stream floodwaters to flood into during overflow storm events. Wetlands also act to filter out contaminants and sediment in stormwater runoff. Wetlands provide shelter and breeding habitat for many organisms.



## Natural Feature: Forest Cover

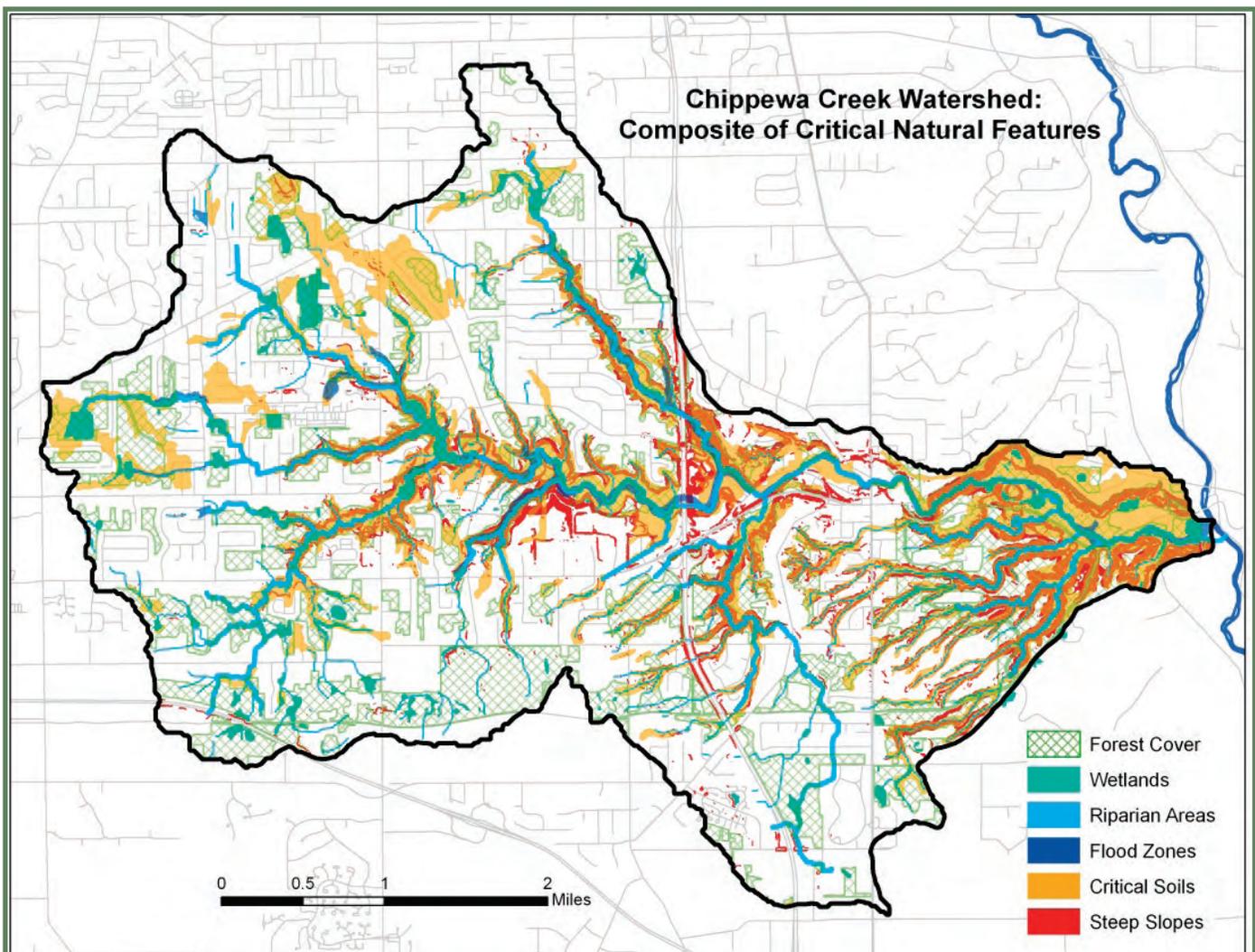
Forest cover consists of tree canopy, understory plants and low, surface vegetative cover. A healthy forest system can save communities storm water infrastructure costs by intercepting and absorbing rain, slowing the rate of runoff and stabilizing soils. Other community benefits include, enhancing property values and reducing household energy costs.

The forest cover analysis was based on visual interpretation of 2002 orthophotos by the Cuyahoga Valley National Park. The identified forested areas were in turn, areas dominated by trees.



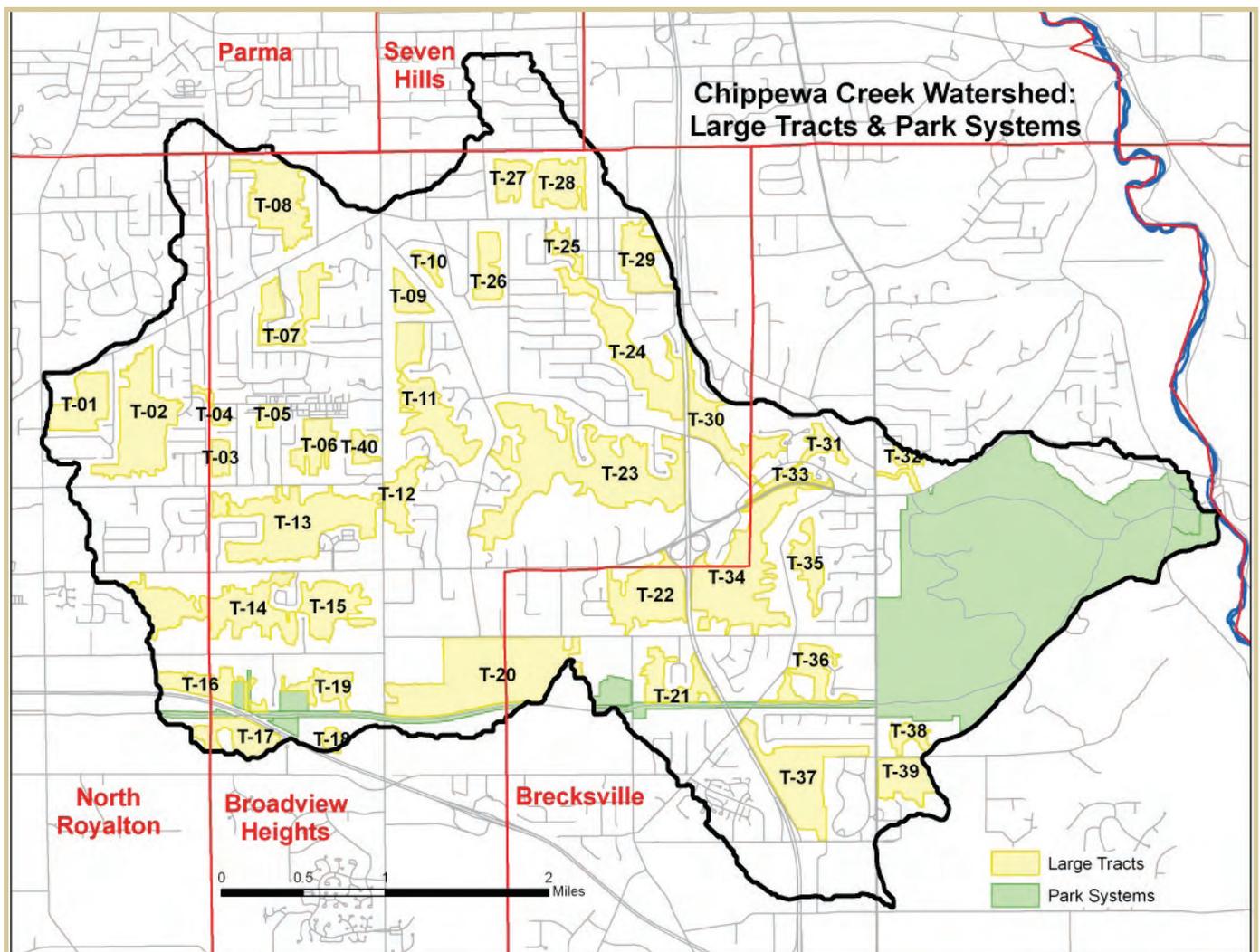
# Chippewa Creek Composite of Critical Natural Features

The composite map embodies all the critical natural features “layered-up” in the Chippewa Creek Watershed. The rationale for choosing these features has been discussed. All together, this map represents the values the watershed partnership expressed and the necessary functional aspect of the Chippewa Creek Watershed.



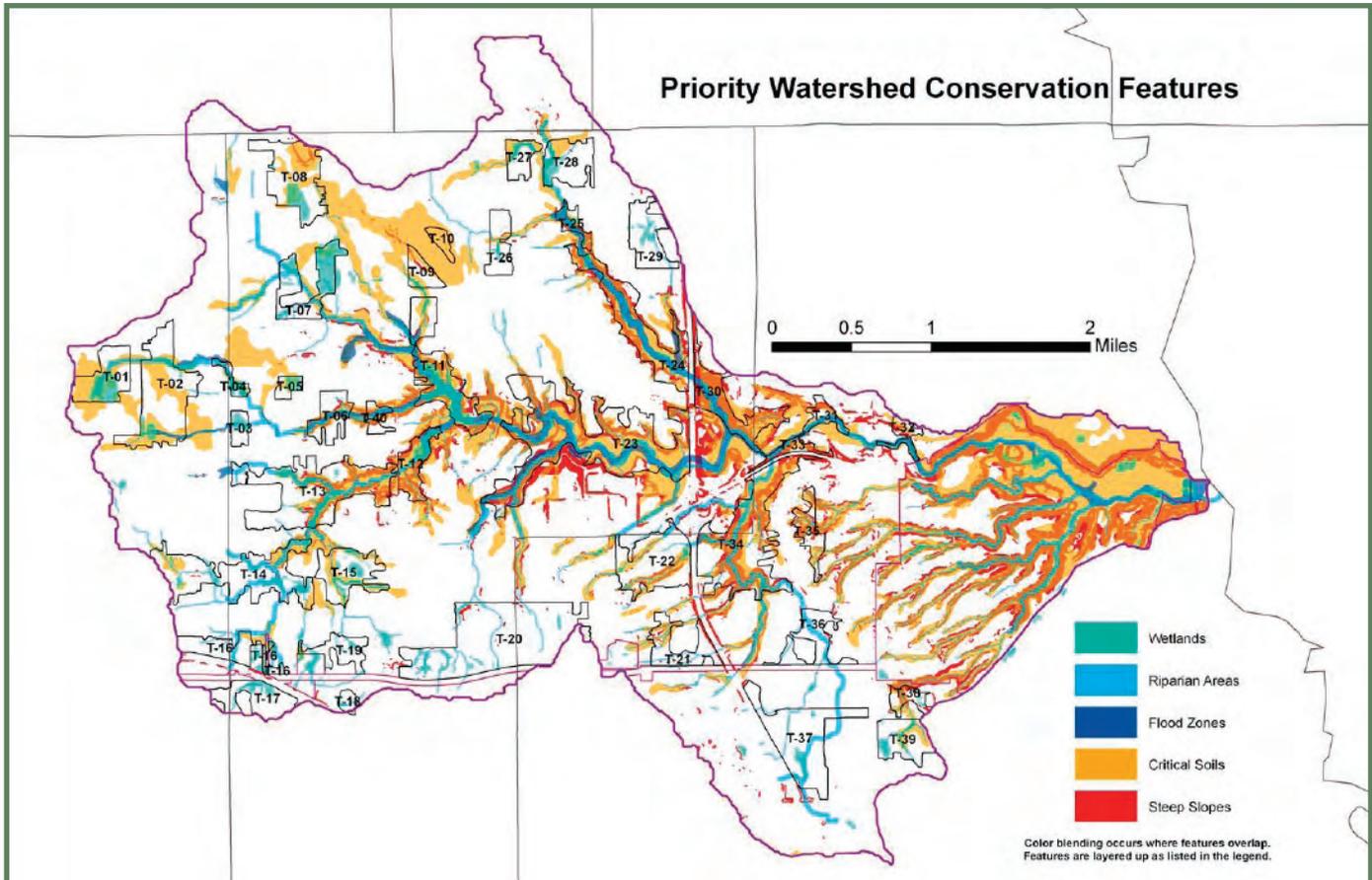
## Step 4: Identify Undeveloped Land Areas and Relationship to Critical Features

Identifying undeveloped land in the Chippewa Creek watershed was the next step. This step helps to identify future development pressures and patterns, relationships to critical natural features, priority conservation areas and priority development areas. To determine the undeveloped land areas we used GIS land cover data generated by the Cuyahoga Valley National Park. The characteristics of the undeveloped land areas varied from flat, heavily forested upland areas that may have high development pressure; land adjacent to creek gorges, with steep terrain that could prove difficult for developers; to back lots of “bowling alley” sized parcels that could be assembled for future development.



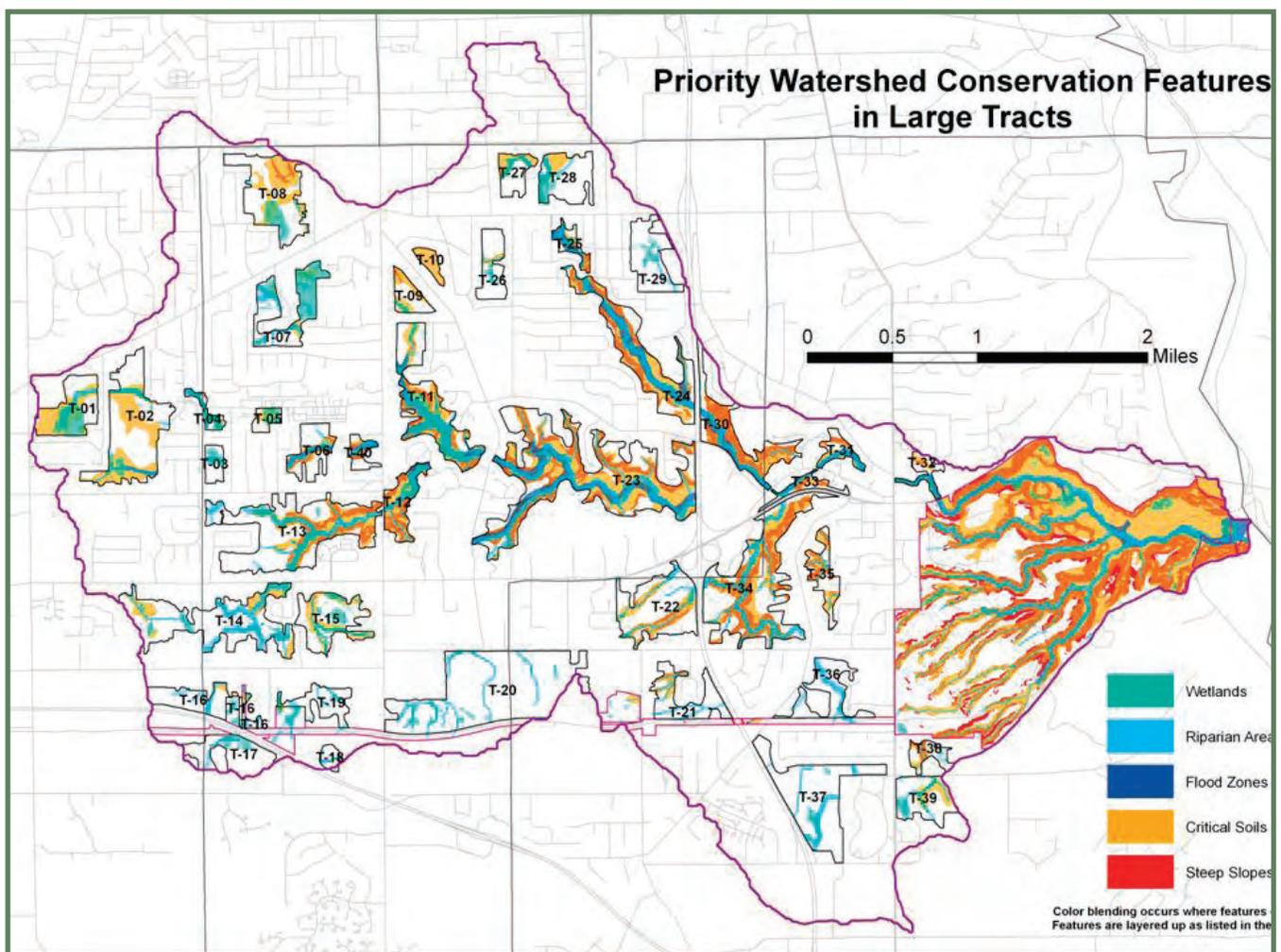
# Chippewa Creek Composite of Critical Natural Features and Large Undeveloped Areas

This map shows the (outlined) large tracts of undeveloped land with all the critical natural features.



# Composite of Critical Natural Features *in* Large Undeveloped Areas

This map shows the large tracts of undeveloped land and all the critical natural features that appear within each tract.



## PCA

### Priority Conservation Areas

Priority conservation areas are locations where land use change is predicted to have a high impact on the watershed in terms of flooding, erosion, and water quality, based on the analysis of several data sets representing criteria that the watershed planning partners determined were of interest.

- **CRITICAL SOILS**

Recommendation: In critical soil areas, communities should develop soil compaction limitations to help conserve this resource during construction. Conservation and low impact design standards are recommended.

- **STEEP SLOPES**

Recommendation: In steep slope areas, communities should conserve these resources to the maximum extent possible for health, safety, property and environmental concerns. Setbacks should be implemented on slopes of 12% or more.

- **STREAMS & NATURAL RIPARIAN AREAS**

Recommendation: Stream and riparian corridor areas should be protected from encroachment at all costs. Communities should adopt riparian setback ordinances to protect both headwater and primary headwater streams. Where impacts occur in these areas, mitigation within the immediate drainage area should be required .

- **FLOODPLAINS**

Recommendation: Communities should conserve flood plains to accommodate excess flow, protect health and property. Community regulations need to maintain current flood plain maps and adequately protect floodplains from development to reduce future damages.

- **WETLANDS**

Recommendation: Wetland areas should be conserved as essential storage and filtration systems. Communities should adopt ample setback ordinances for all wetlands categories.

- **FORESTS**

Recommendation: Communities should conserve forested areas within riparian corridors and minimize the loss of existing forested areas throughout the entire watershed, through conservation development and tree preservation regulations.

## PDA

### Priority Development Areas

Priority development areas are locations where land use changes are predicted to have minimal impact on the watershed and where conditions suggest that additional development may be appropriate.

The Chippewa Creek Watershed includes five municipalities with zoning, water and sewer availability and many other factors deemed important for development (see “Top Ten Development Suitability Factors inset).

The height of development pressure in the five communities has largely passed. Most of the communities report a waning of development proposals.

Nevertheless, priority development areas were identified tract by tract with community and land owner recommendations.

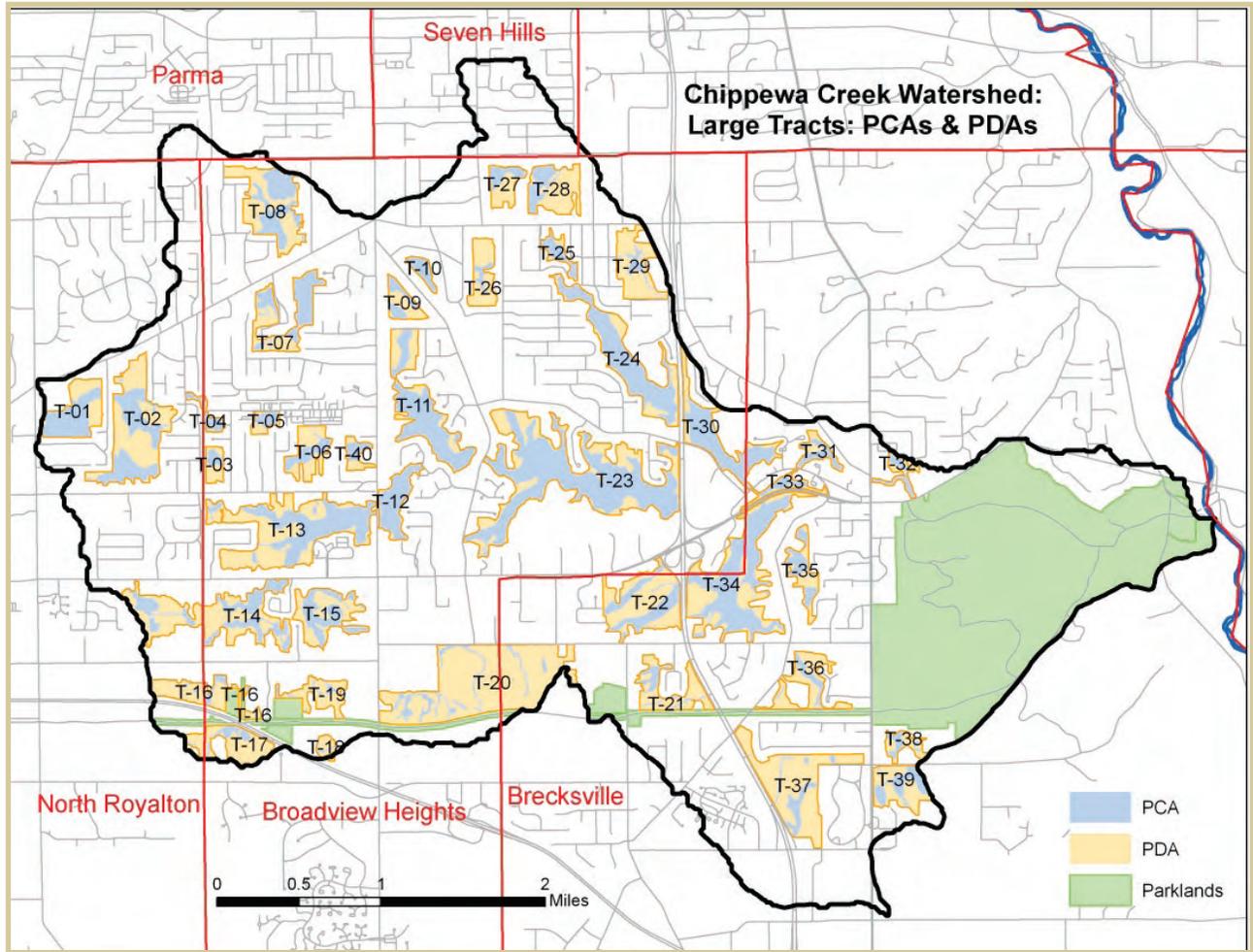
PDA characteristics are:

1. Undeveloped land that does not lie within critical watershed features (i.e. wetland setback, riparian setback, FEMA 100 year floodplain, steep slope)
2. Previously developed areas suitable for redevelopment

The Ohio Lake Erie Commission Balanced Growth Program established a development suitability technical advisory committee to determine which factors were most important to the development community.

See the table opposite for the results. >>>

# Step 5: Identifying PCAs & PDAs



## TOP TEN DEVELOPMENT SUITABILITY FACTORS

RESIDENTIAL	COMMERCIAL	INDUSTRIAL
1. Public water availability	1. Public water availability	1. Proximity to highway
2. Public sewer availability	2. Public sewer availability	2. Public sewer availability
3. Pro-development community attitude	3. Median household income in community	3. Public water availability
4. School quality	4. Community population density	4. Land availability
5. Land cost	5. Proximity to highway	5. Proximity to highway interchange
6. Median household income in community	6. Community growth characteristics	6. Pro-development attitude of community
7. Land availability	7. Land availability	7. Proximity to employees.
8. Community growth characteristics	8. Pro-development community attitude	8. Land cost
9. Proximity to highway	9. Proximity to highway interchange	9. Soil type / stability
10. Proximity to highway interchange	10. Proximity to other commercial development	10. Median household income

# PDA & PCA Analysis - TRACT-BY-TRACT

Each of the large tracts identified in the Balanced Growth Plan were analyzed for future balanced growth opportunities. The large tracts are listed from largest to smallest. The report summaries include:

1. Location and size (acreage)
2. PCA & PDA areas
3. Quantified critical watershed features
4. Potential greenspace connections
5. Restoration and enhancement opportunities
6. Zoning
7. Development opportunities

*The following maps are presented in order of size.*

*In the tables that accompany each map, CCBT refers to the “Chippewa Creek Big Tract”.*

*The total at the bottom of each table combines all the natural features acreages in that CCBT. Since features overlap, this number is used primarily to indicate the density of critical features within a tract.*

**PLEASE NOTE:** *The maps identifying PCAs and PDAs are approximate assessments. Ground-truthing would be required for more detailed analysis.*

## LARGE TRACT DESIGNATIONS

**PCA:** Area has a unique natural resource and is rich with critical watershed features. Less than 40% of land area is suitable for development and therefore conservation efforts should be explored.

**PCA - Conservation Development:** Area is rich with critical watershed features and is worthy of conservation. Less than 40% of land area is suitable for development. Should development occur, conservation-type development should be used to limit watershed impacts.

**PCA - Restoration:** Area contains both critical watershed features and little room suitable for future development. Efforts can be made to enhance or restore watershed features on site to increase stormwater capacity and filtration.

**PCA - Landlocked:** Area is small, surrounded by development and majority of the area contains steep, difficult terrain and flood-plains.

**PDA - Conservation Development:** More than 40% of the land area is suitable for development. However, specific attention should be made to the critical watershed features on site. Conservation development and/or low impact development is suggested to limit watershed impacts.

**PDA - Recreation:** More than 40% of the land area is suitable for development. Plans or discussions have occurred to implement a recreational development. Recreational design plans should recognize and protect the watershed features.

## ANALYSIS OF LARGE TRACTS

	Total Acres	Critical Soils	Steep Slopes	Flood Zones	Riparian Corridors	Headwater Riparian Corridors	Forest Cover	Wetlands
Large Tracts (acres)	2,608.9	1,032.4	338.9	160.0	316.6	115.4	2,304.7	244.3
Non-Park Watershed Total (acres)	10,119.1	2,267.8	847.4	246.2	526.6	248.2	2,934.6	280.8
Large Tracts as % of Non-Park Watershed	26%	46%	40%	65%	60%	46%	79%	87%

The analysis indicates that although these large tracts represent only 26% of non-park land, they hold the vast majority of wetlands, forests, floodzones and riparian corridors, and almost half the watershed’s other critical features. The opportunity exists to conserve these resources and their functions and should be a priority.

# Undeveloped Area #23

(PCA with Conservation Development)

Large tract #23, at 277 acres, is the largest of all the identified undeveloped lands. This land area, located in Broadview Heights, straddles the mainstem of Chippewa Creek and currently includes 87 property parcels under various ownerships.

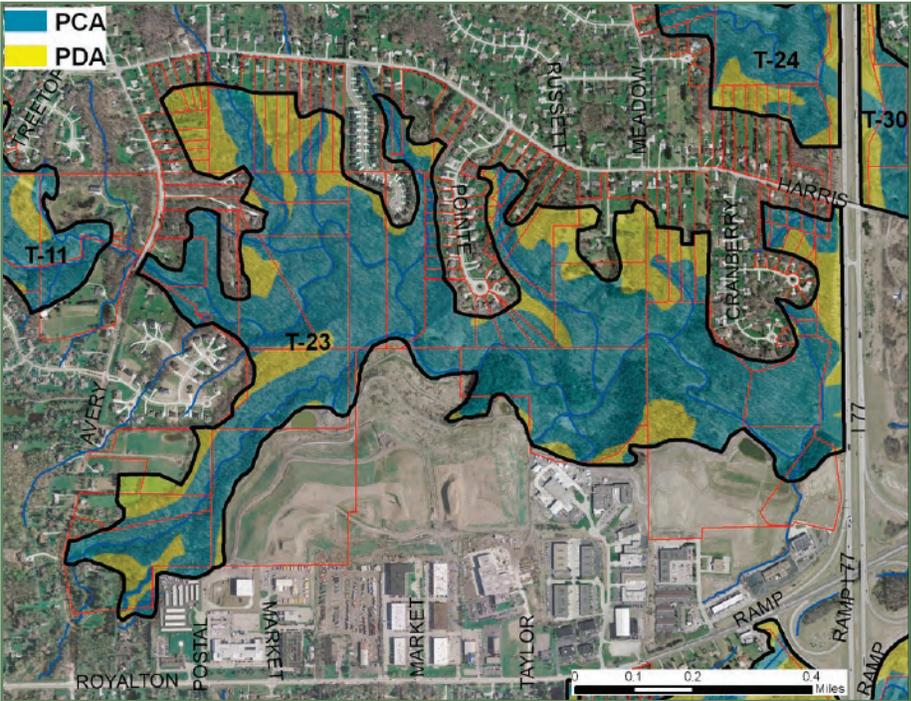
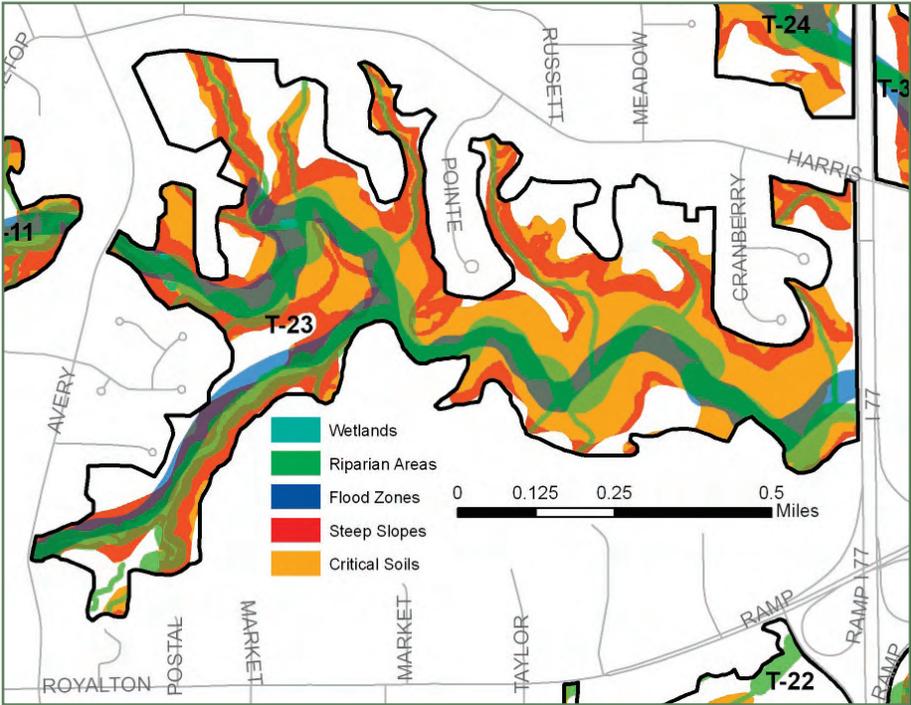
The landfill in Broadview Heights is located along its southern border.

This land area is significant for its steep slopes, forest cover, critical soils and flood zones along the mainstem of Chippewa Creek.

Of the 277 acres, 69 acres (25%) exist without any critical watershed features except forest cover (\*calculation does not include forest cover).

This area is zoned as single family residential, but offers little in the way of development opportunities, considering the steep terrain and the nearby landfill. The northern border may offer areas for residential development but it is strongly encouraged that critical watershed features be protected with appropriate ordinances and setback measures.

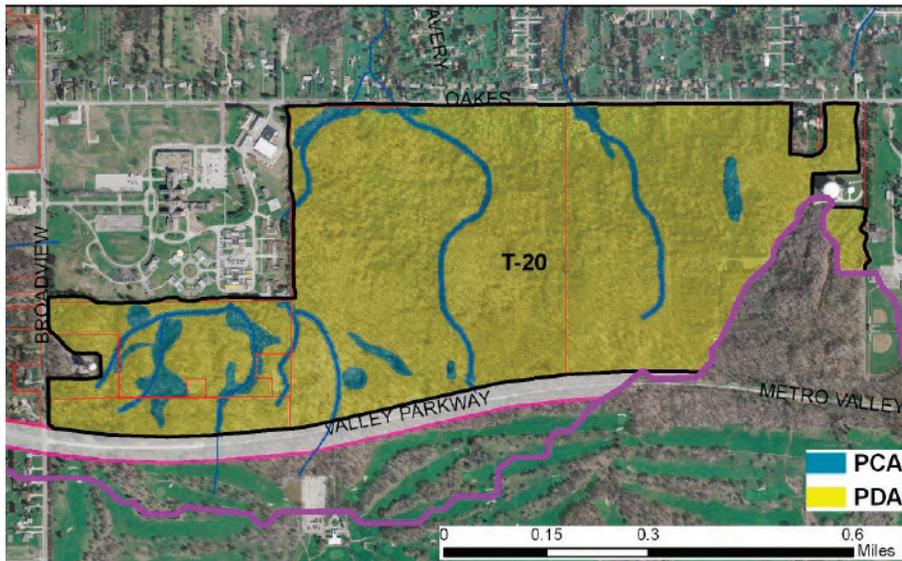
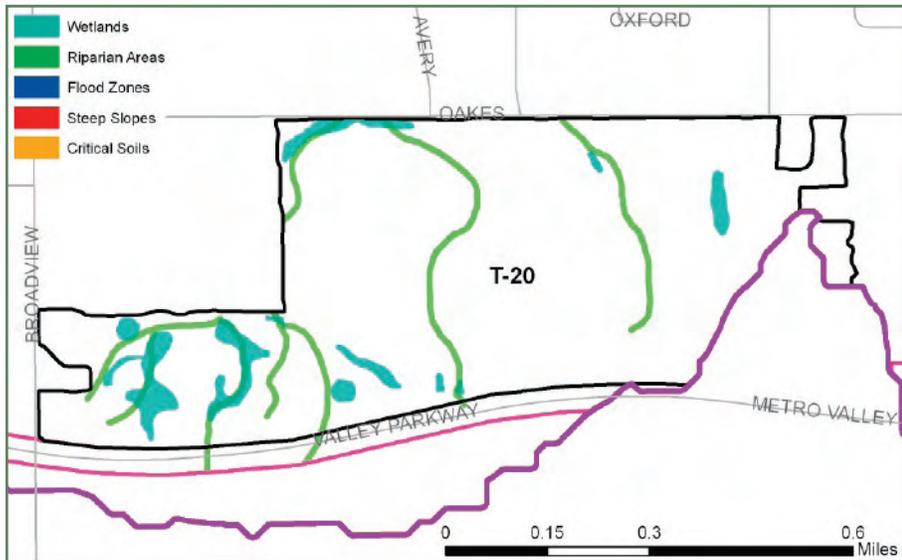
Conservation and low-impact style of development is recommended to maintain the natural resources of the area while retaining zoning density.



Large Tract	T23
Total CCBT Acres	277.2
Number of Parcels	87
Critical Soils	201.6
Steep Slopes	81.3
Flood Zones	55.0
Streams	3.1
Headwater Stream	15.8
Forest	244.6
Wetlands	0.5
<b>Total</b>	<b>601.8</b>

# Undeveloped Area #20

(PDA - Recreation)



Large tract #20 is the second-largest piece of undeveloped land in the watershed at 236 acres.

This land area, located in both Broadview Heights and Brecksville, includes the old Cleveland Tree Farm, which is now owned by the city of Brecksville.

This area is also adjacent to the Cleveland Metroparks Parkway to the South and Metroparks property to the East.

Large tract #20 has significant forest canopy cover, primary headwater streams and wetlands.

Approximately 212 acres is suitable for development. Discussions have occurred to establish a recreational park in this area. Future development efforts should recognize and avoid impacts to the priority conservation areas (primary headwater streams and wetlands) and specific attention should be made to maintaining a high forest canopy cover onsite as well.

Large Tract	T20
Total CCBT Acres	236
Number of Parcels	6
Critical Soils	0
Steep Slopes	0
Flood Zones	0
Streams	0
Headwater Stream	12.8
Forest	229.6
Wetlands	12.9
<b>Total</b>	<b>255.3</b>

# Undeveloped Area #34 (PCA with Conservation Development)

Large tract #34 is the third-largest undeveloped area in the watershed at 172 acres.

The majority of this land is located in Brecksville with a smaller portion in Broadview Heights and just downstream is the Cleveland Metroparks and Cuyahoga Valley National Park.

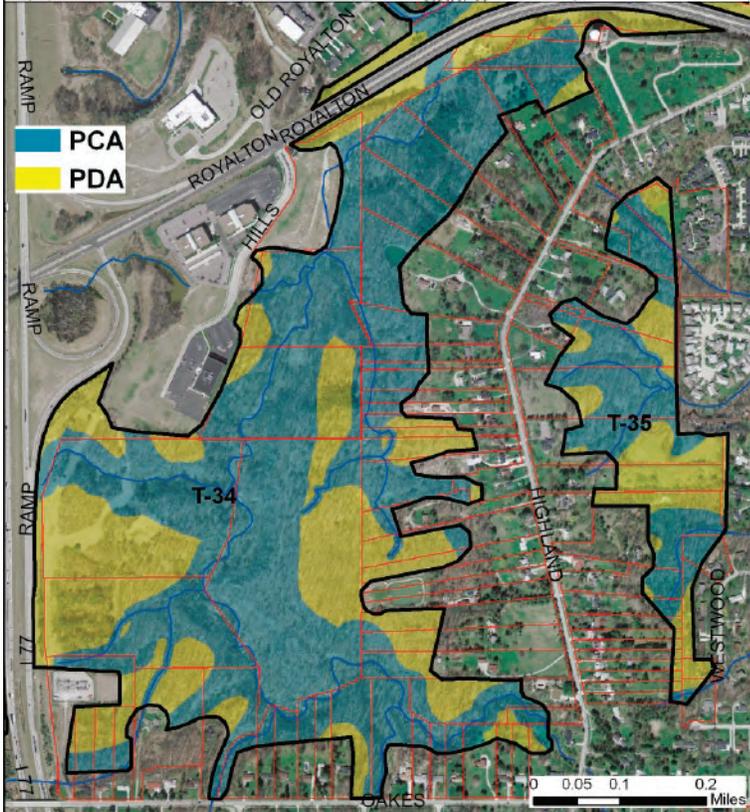
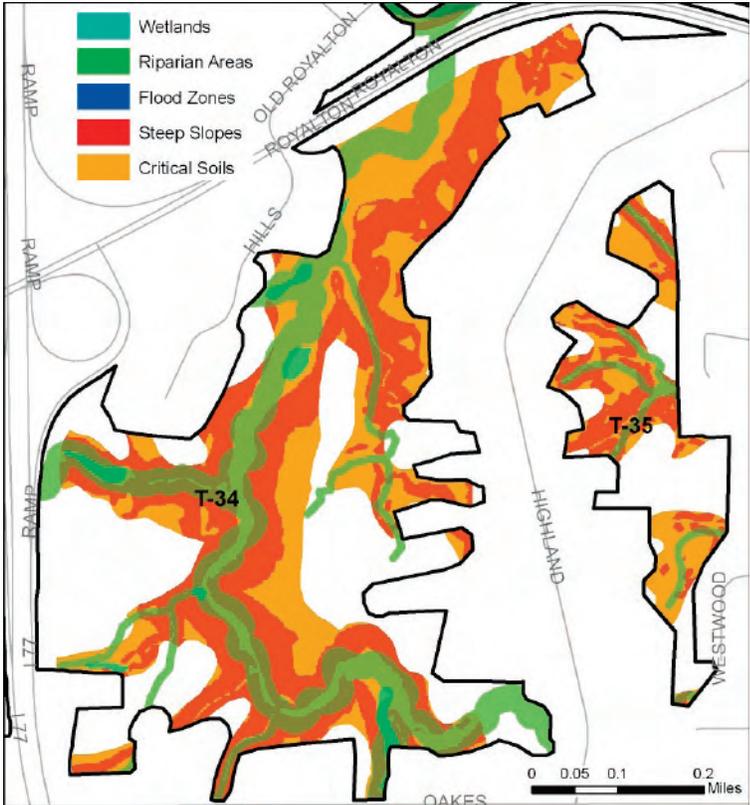
A large percentage of this land area contains critical natural features leaving little area that is openly suitable for development.

Of the 172 acres, there are approximately 60 acres (35%) that do not contain critical watershed features other than forest cover, therefore making those areas suitable for development.

This area is zoned for single family housing. With regard to environmental land use zoning, specific attention should be given to conserving the streams, primary headwater streams and wetlands with appropriate setbacks and conservation development.

Areas of a site with critical soils should be conserved as much as possible and these areas should ideally be incorporated into undisturbed natural or open space areas. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T34
Total CCBT Acres	172.1
Number of Parcels	56
Critical Soils	107.2
Steep Slopes	57.8
Flood Zones	0
Streams	0.2
Headwater Stream	6.4
Forest	152.3
Wetlands	2.8
<b>Total</b>	<b>326.7</b>



# Undeveloped Area #13

(PDA - Conservation Development)

Large tract #13 is the fourth-largest undeveloped area with 169 acres.

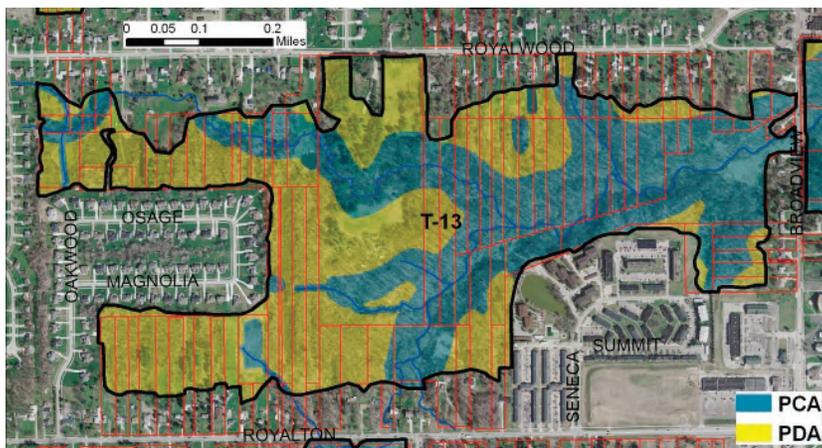
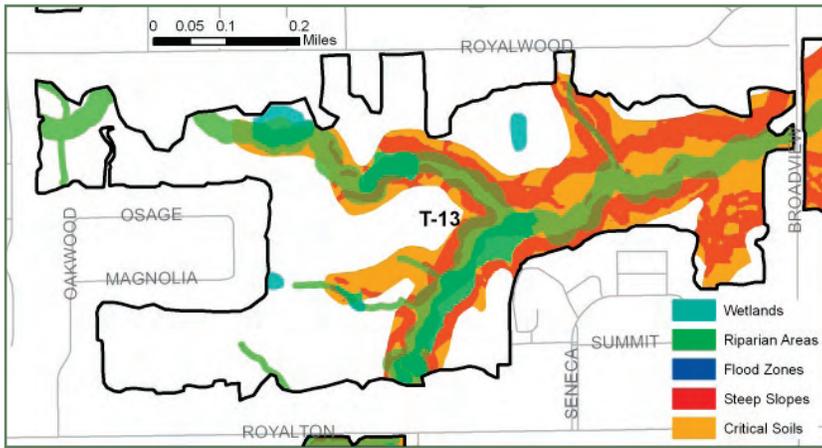
This undeveloped land is wholly located in the city of Broadview Heights, situated near the western border.

This area is importantly situated along a tributary stream that feeds into the main-stem of Chippewa Creek.

The area contains a large amount of important forest canopy, critical soils, wetlands, primary headwater streams and is located close to other identified large tracts.

Of the 169 acres, there are approximately 88 acres (52%) that do not contain critical watershed features, therefore making those areas suitable for development (\*calculation does not include forest cover).

This area is zoned single family housing. With regard to environmental land use zoning, specific attention should be given to conserving the primary headwater streams, wetlands and steep slopes with appropriate setbacks and conservation development. Areas of a site with critical soils should be conserved as much as possible and these areas should ideally be incorporated into undisturbed natural or open space areas. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T13
Total CCBT Acres	169.8
Number of Parcels	103
Critical Soils	72.7
Steep Slopes	31.2
Flood Zones	0
Streams	0
Headwater Stream	4.5
Forest	139.2
Wetlands	11.3
<b>Total</b>	<b>258.8</b>

# Undeveloped Area #14

(PDA - Conservation Development)

Large tract #14 is the fifth-largest undeveloped area in the watershed with 136 acres.

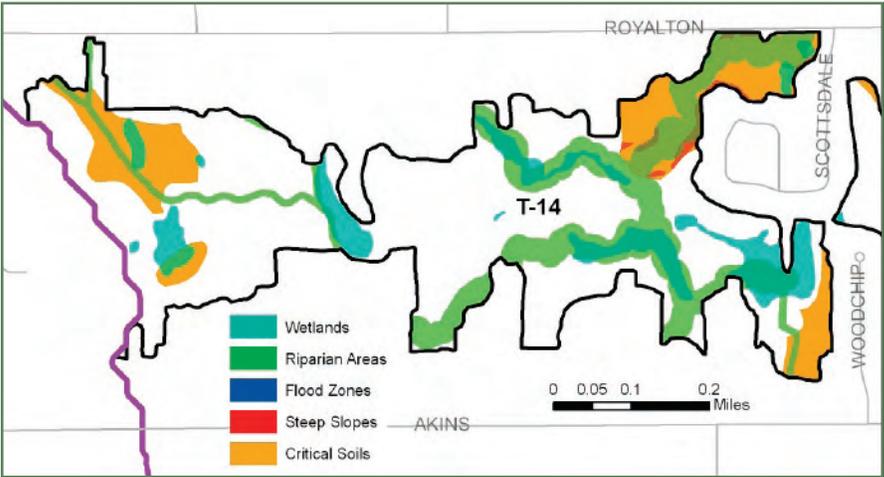
This undeveloped land straddles the boundary between North Royalton and Broadview Heights.

It is importantly situated in the headwaters of the watershed helping trap rainwater near its source. The area contains large amounts of forest, primary headwater streams, wetlands and critical soils.

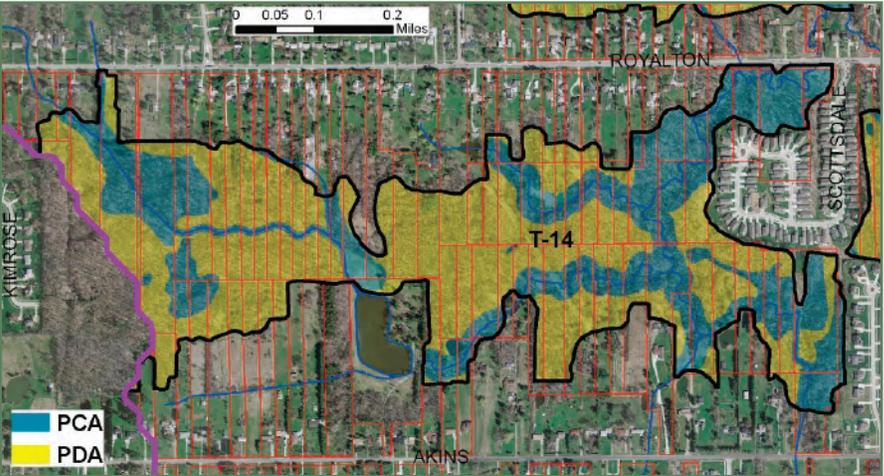
Of the 136 acres, approximately 79 acres (58%) do not contain critical watershed features, therefore making those areas suitable for development (\*calculation does not include forest cover).

The area is zoned for single family housing. With regard to environmental land use zoning, specific attention should be given to conserving the primary headwater streams, wetlands with appropriate setbacks and conservation development.

Areas of a site with critical soils should be conserved as much as possible and these areas should ideally be incorporated into undisturbed natural or open space areas. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T14
Total CCBT Acres	136.0
Number of Parcels	93
Critical Soils	27.1
Steep Slopes	1.7
Flood Zones	0.0
Streams	0.0
Headwater Stream	4.7
Forest	117.5
Wetlands	15.9
<b>Total</b>	<b>166.8</b>



# Undeveloped Area #2

(PDA - Conservation Development)

Large tract #2 is the sixth-largest undeveloped area in the watershed with 127 acres.

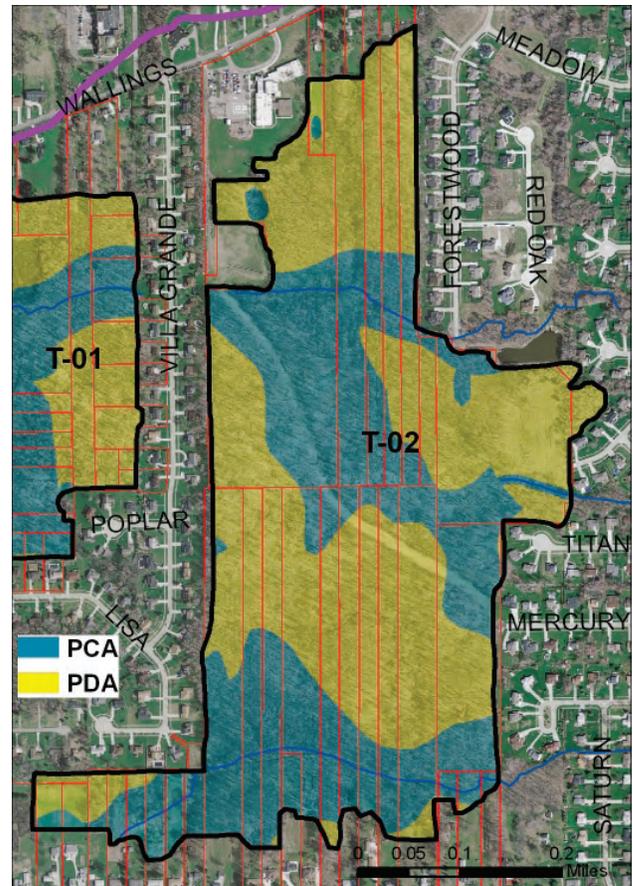
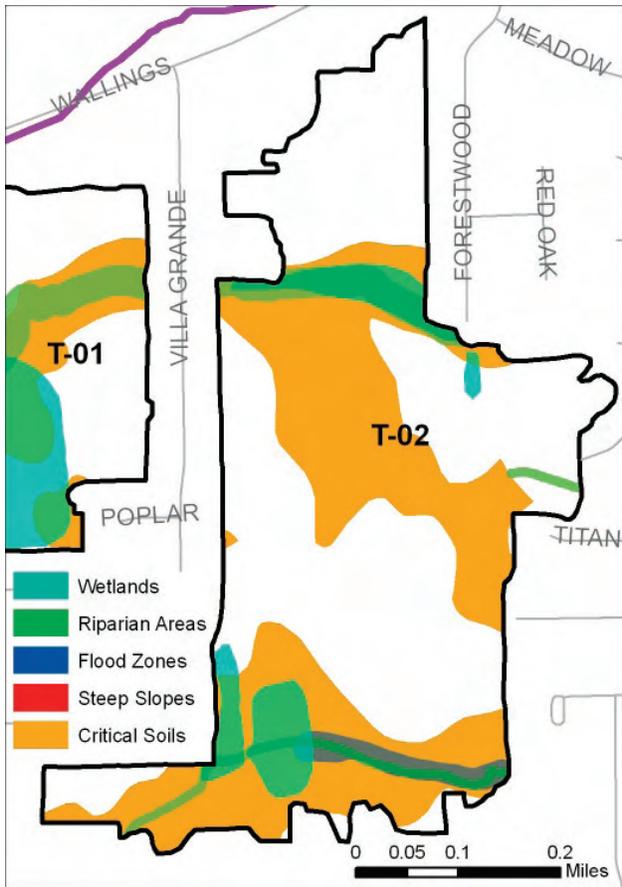
This area is wholly located with the city of North Royalton. This land area is also extremely important due to its location in the headwaters which helps to trap rainwater near its source.

The area contains forest, wetlands, primary headwater streams, flood zones and critical soils.

Of the 127 acres, approximately 70 acres (55%) of the area contain no critical watershed features, therefore making those areas suitable for development (\*calculation does not include forest cover).

This area is zoned for single family residential and recent development (15 homes) has occurred on the old school board site. With regard to environmental land use zoning, specific attention should be given to conserving the primary headwater streams, wetlands, flood zones with appropriate setbacks and conservation development. Areas of a site with critical soils should be conserved as much as possible and these areas should ideally be incorporated into undisturbed natural or open space areas. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T2
Total CCBT Acres	127.2
Number of Parcels	33
Critical Soils	56.1
Steep Slopes	0.0
Flood Zones	3.1
Streams	0.0
Headwater Stream	3.0
Forest	119.4
Wetlands	9.7
<b>Total</b>	<b>191.3</b>



# Undeveloped Area #37

(PDA - Conservation Development)

Large tract #37 is the seventh-largest area of undeveloped land in the watershed with 116 acres.

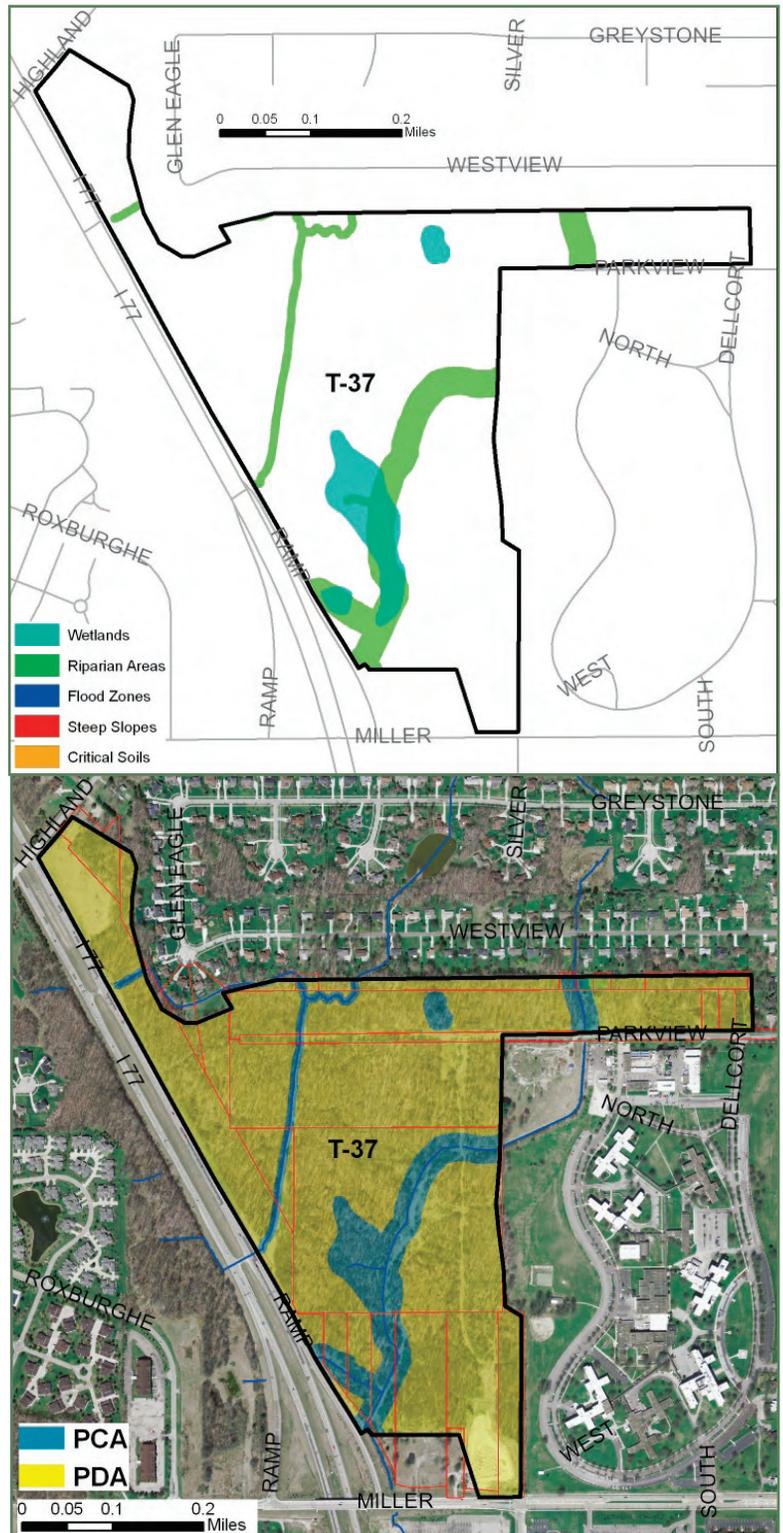
This area is wholly located within the city of Brecksville. This large tract is located behind the Veterans Hospital and is part of a potential new retail development.

This upland area contains large amounts of forest cover and also has primary headwaters streams running through, and fairly significant wetland areas.

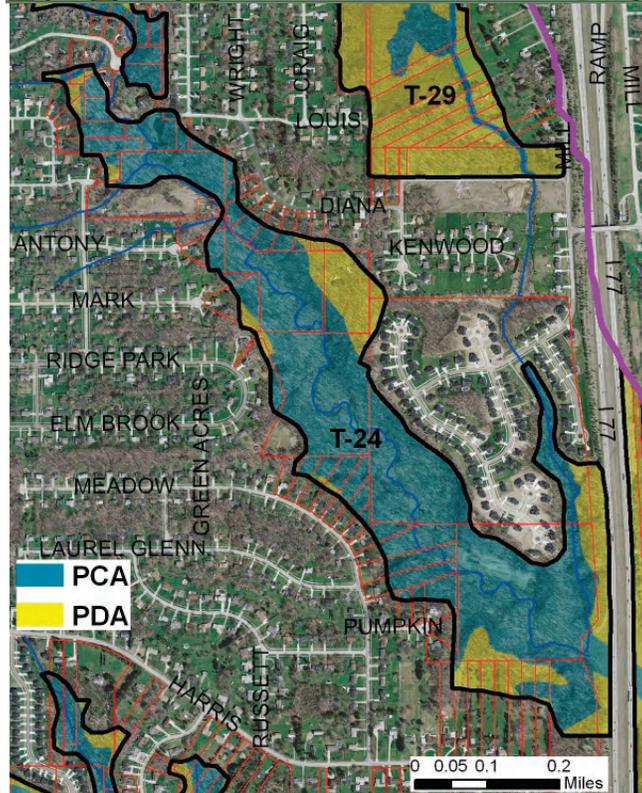
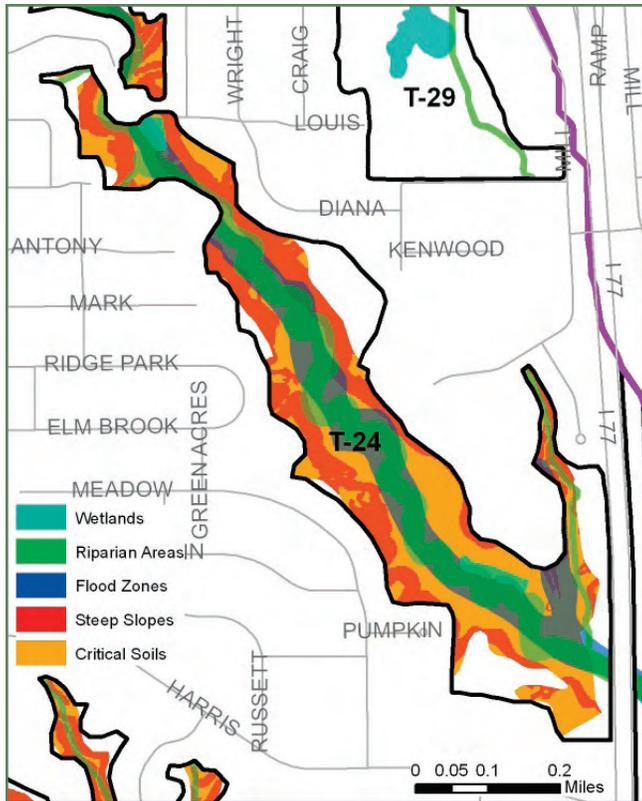
Of the 116 acres, there are approximately 99 acres (85%) that contain no critical watershed features, therefore those areas are suitable for development (\*calculation does not include forest cover).

With regard to environmental land use zoning, specific attention should be given to conserving the primary headwater streams, wetlands, with appropriate setbacks and conservation retail development. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T37
Total CCBT Acres	116.6
Number of Parcels	20
Critical Soils	0.0
Steep Slopes	0.0
Flood Zones	0.0
Streams	0.0
Headwater Stream	0.0
Forest	113.3
Wetlands	6.7
<b>Total</b>	<b>123.0</b>



# Undeveloped Area #24 (PCA)



Large tract #24 is the eighth-largest undeveloped land area in the watershed, with 104 acres.

This area of land is entirely located in the city of Broadview Heights and follows along Bramblewood Branch a tributary to Chippewa Creek.

Along this area of land are important flood zones, steep slopes, stream corridors, forest, wetlands and critical soils. Immediately up stream are other large tracts which could be pieced together and enhanced for stormwater management and other ecological services.

Of the 104 acres, only 19 acres (18%) exist without critical watershed features, leaving little area that is suitable for development (\*calculation does not include forest cover).

This areas is zoned for single family housing. Should housing be targeted for this area, specific attention should be paid to setbacks from flood zone and steep slopes. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use

Large Tract	T24
Total CCBT Acres	104.8
Number of Parcels	50
Critical Soils	83.6
Steep Slopes	31.0
Flood Zones	31.0
Streams	0.4
Headwater Stream	3.3
Forest	90.6
Wetlands	1.9
<b>Total</b>	<b>241.7</b>

# Undeveloped Area #11 (PCA)

Large tract #11 is the ninth-largest undeveloped piece of land in the watershed at 102 acres.

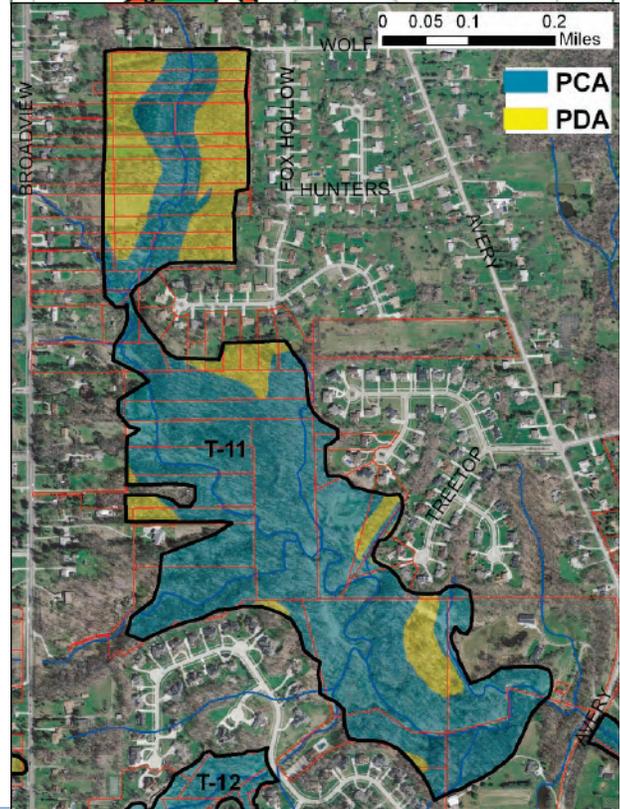
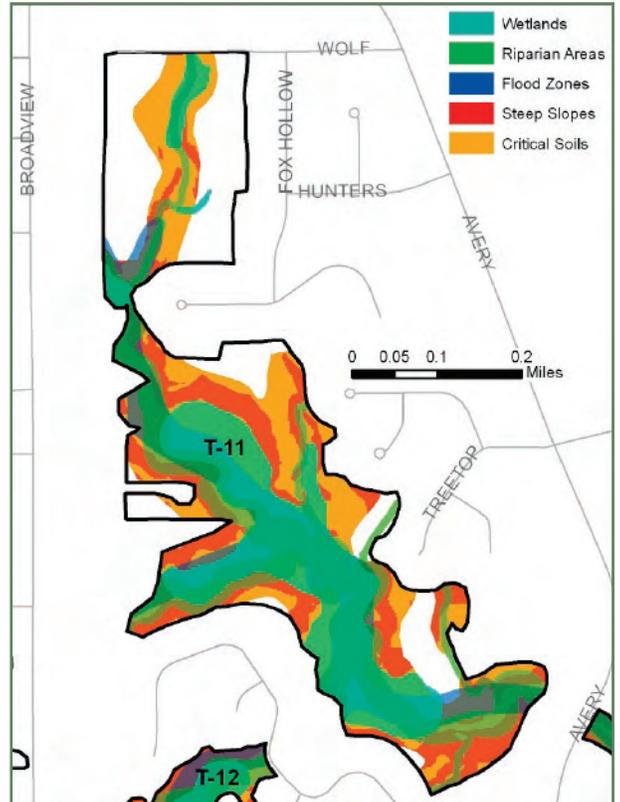
This area of land is entirely within the city of Broadview Heights and is uniquely located at the confluence of multiple streams.

A huge wetland complex (29 acres) exists in this area, at the confluence, and is strategically located to receive and store stormwater from three tributaries. This is a key wetland resource that should be preserved, if not enhanced.

Other important resources located in the area are flood zones, streams, forested areas, steep slopes and critical soils. Of the 102 acres, approximately 24 acres (23%) of the area exists without critical watershed features, leaving little area that could be suitable for development (\*calculation does not include forest cover).

This area is zoned for single family dwellings, but efforts should be made to preserve this open space. Should housing be targeted for this area, specific attention should be made to setbacks on the flood zone and the considerable amount of stormwater that could flood this area. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use

Large Tract	T11
Total CCBT Acres	102.0
Number of Parcels	58
Critical Soils	76.7
Steep Slopes	25.6
Flood Zones	26.0
Streams	25.8
Headwater Stream	5.7
Forest	93.2
Wetlands	29.1
<b>Total</b>	<b>282.1</b>



# Undeveloped Area #22

(PDA - Conservation Development)

Large tract #22 is the tenth-largest undeveloped area in the watershed at 96 acres.

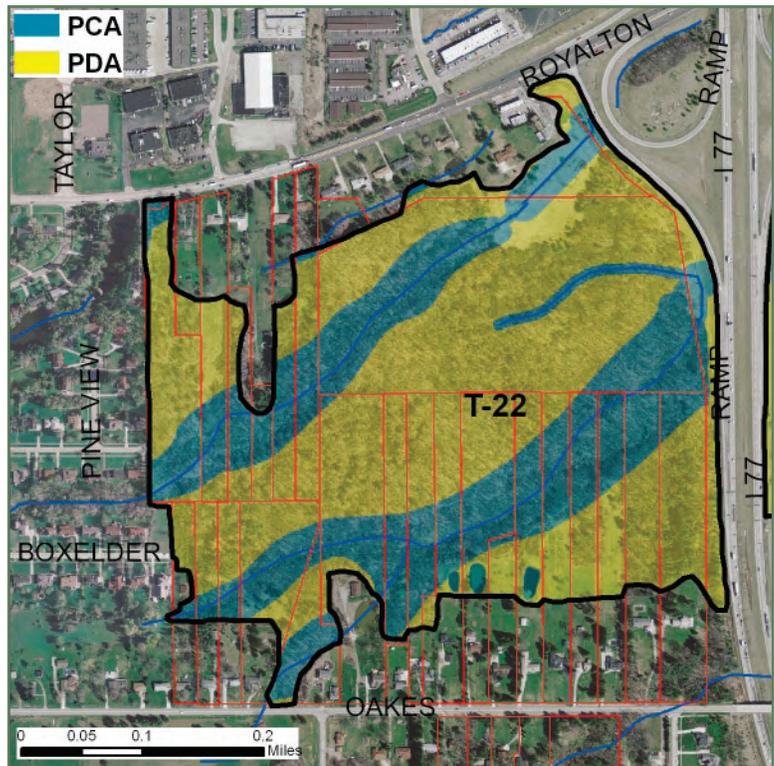
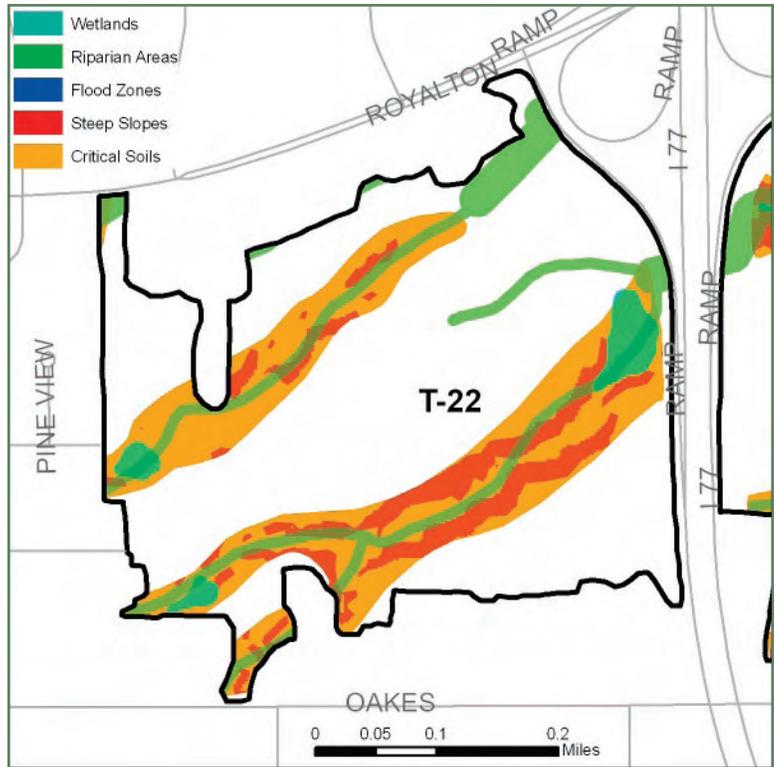
This area is largely located in the city Brecksville with a smaller portion falling in Broadview Heights.

This open space is located near the interchange of I-77 and Route 82, and contains a large forested area and important primary headwater streams, wetlands, steep slopes and critical soils.

Of the 96 acres, approximately 60 acres (63%) of open space are without critical watershed features (\*calculation does not include forest cover).

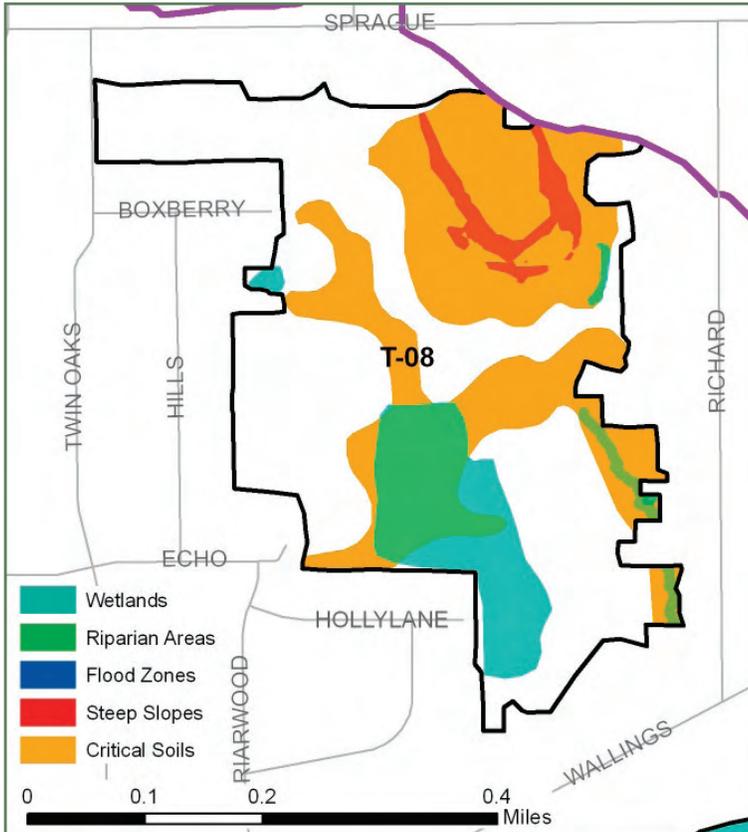
This area is zoned for Office / Laboratory development. Due to the area's convenient highway location and manageable amount of critical watershed features this area could be suitable for development.

Should office development be targeted for this area, specific attention should be made to setbacks on the primary headwater streams and wetlands. Areas of a site with critical soils should be conserved as much as possible and should ideally be incorporated into undisturbed natural or open space areas. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T22
Total CCBT Acres	96.4
Number of Parcels	28
Critical Soils	31.3
Steep Slopes	8.7
Flood Zones	0.0
Streams	.8
Headwater Stream	7.9
Forest	80.4
Wetlands	2.7
<b>Total</b>	<b>131.8</b>

# Undeveloped Area #08 (PDA - Conservation Development)



Large tract #08 is the eleventh-largest undeveloped area in the watershed at 93 acres.

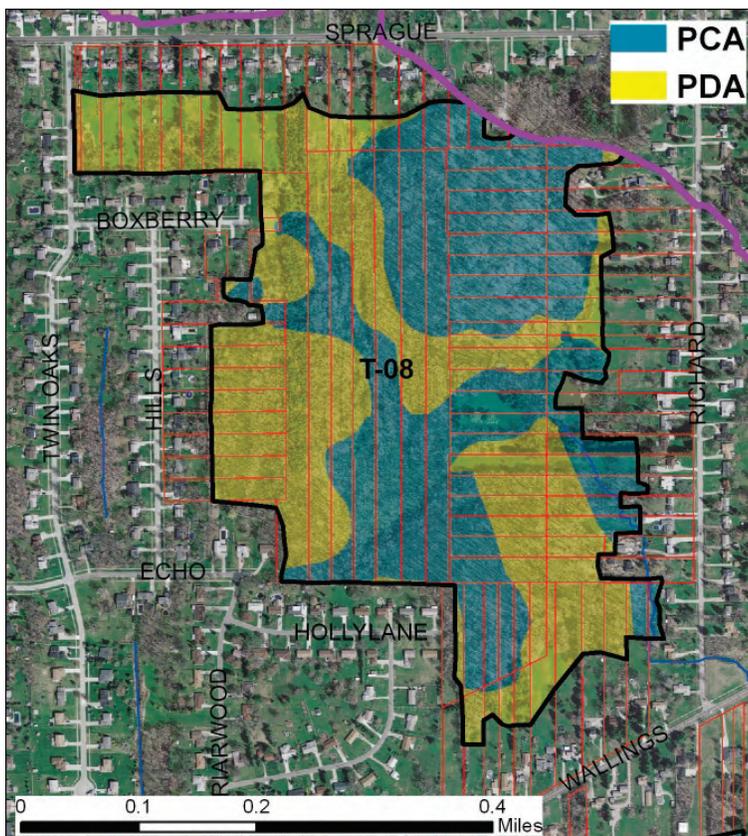
This open space is located in the northwest corner of the city of Broadview Heights, just north of E. Wallings Road.

This area contains a significant wetland complex (12.8 acres) that should be preserved and or enhanced during future efforts. The area also has some forested areas, steep slopes and critical soils.

Of the 93 acres, approximately 48 acres (51%) contain no critical watershed features (\*calculation does not include forest cover).

This area is zoned single family residential. Should residential development be targeted for this area, efforts should be made to protect the wetland complex.

Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T08
Total CCBT Acres	93.4
Number of Parcels	96
Critical Soils	39.6
Steep Slopes	3.2
Flood Zones	0.0
Streams	0.0
Headwater Stream	1.1
Forest	72.2
Wetlands	12.8
<b>Total</b>	<b>128.8</b>

# Undeveloped Area #30

(PCA - Restoration)

Large Tract	T30
Total CCBT Acres	71.0
Number of Parcels	11
Critical Soils	54.4
Steep Slopes	36.6
Flood Zones	12.5
Streams	0.5
Headwater Stream	1.2
Forest	64.3
Wetlands	0
<b>Total</b>	<b>169.5</b>

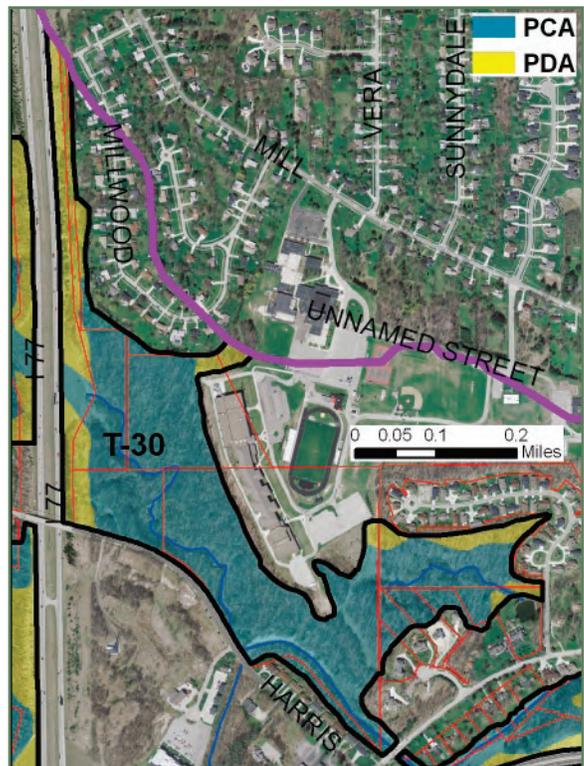
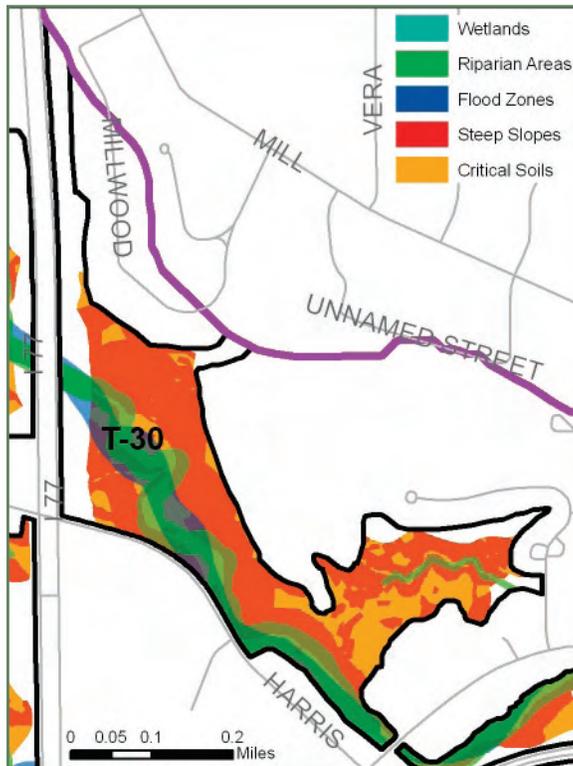
Large tract #30 is the twelfth-largest open space area in the watershed with 71 acres.

This open space is located on the border of Broadview Heights and Brecksville and is in the Northeast quadrant of I-77 and route 82.

Large tract #30 surrounds the Bramblewood Creek's lower deep gorge as it meets Chipewewa Creek. This area contains significant amounts of steep slopes, forested corridors, floodzones and critical soils.

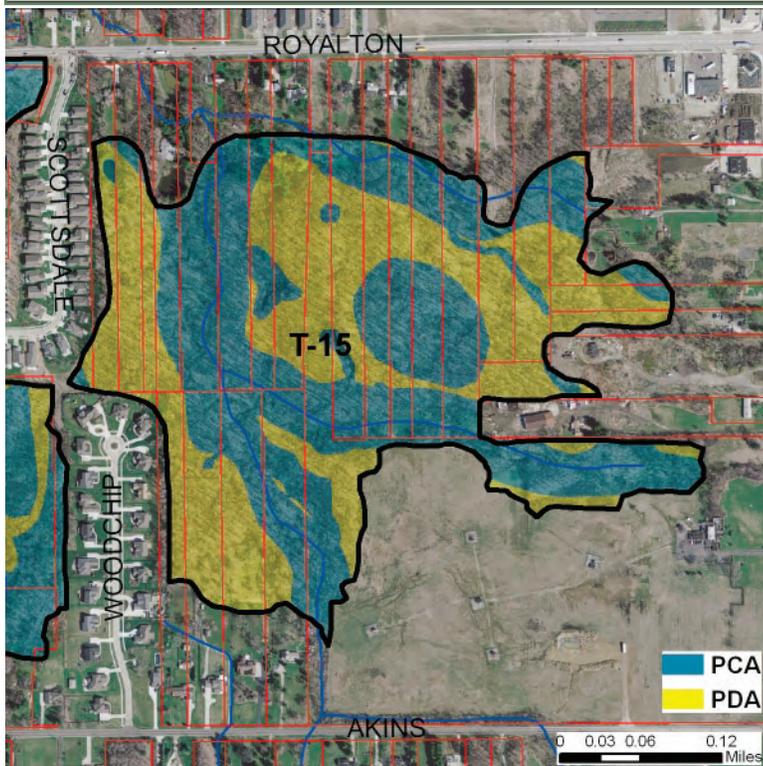
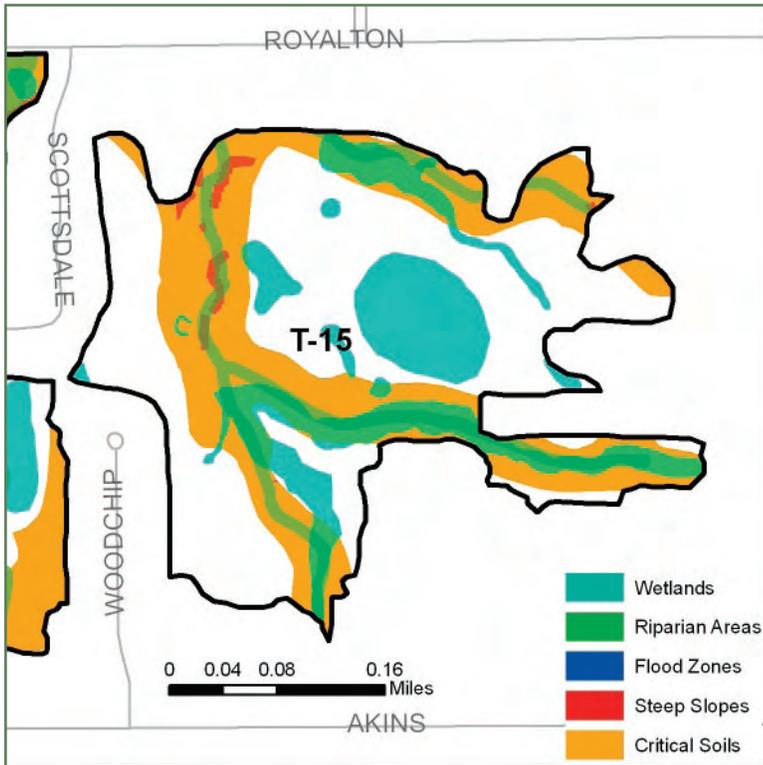
Nearby are four other large tracts providing opportunities for preservation and green space connections.

Of the 71 acres, only 15 acres (21%) of the area exist without any critical watershed features, leaving little area suitable for development (\*calculation does not include forest cover). As evidenced by the development patterns surrounding this area, the steep terrain is unsuitable for future development and could be pursued for restoration options.



# Undeveloped Area #15

(PCA - Conservation Development)



Large tract #15 is the thirteenth-largest open space area in the watershed with 63 acres.

This area is located in the city of Broadview Heights and is near the Route 82 and Broadview Road.

Much of the area contains forest with a complex of primary headwater streams and wetlands. The area also contains critical soils and small amount of steep slopes. Other open space areas exist nearby (#13 & #14) which provides opportunities for preservation and green space connections.

Of the 63 acres, almost 30 acres (47%) exist without any critical watershed feature (\*calculation does not include forest cover).

Most of the site is zoned for office space with a portion zoned single family residential. Should office development be targeted in this area, appropriate setback measures should be applied to the wetland and primary headwater complex.

Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques available for office sites. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T15
Total CCBT Acres	63.1
Number of Parcels	28
Critical Soils	25.9
Steep Slopes	0.8
Flood Zones	0.0
Streams	0.0
Headwater Stream	5.6
Forest	55.3
Wetlands	14.8
<b>Total</b>	<b>102.3</b>

# Undeveloped Area #07

(PCA - Conservation Development)

Large tract #07 is the fourteenth-largest open space area in the watershed with almost 63 acres.

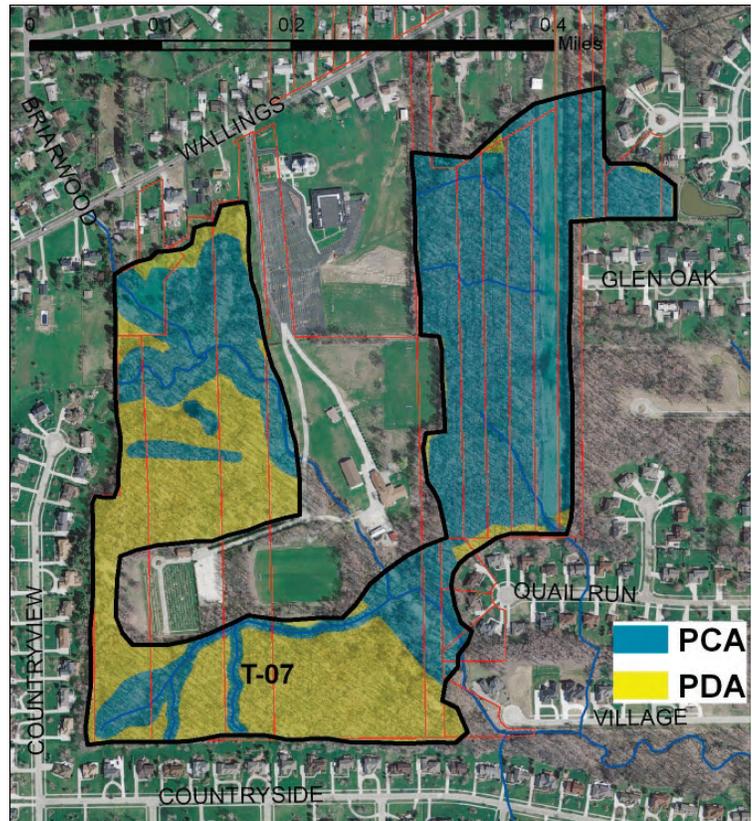
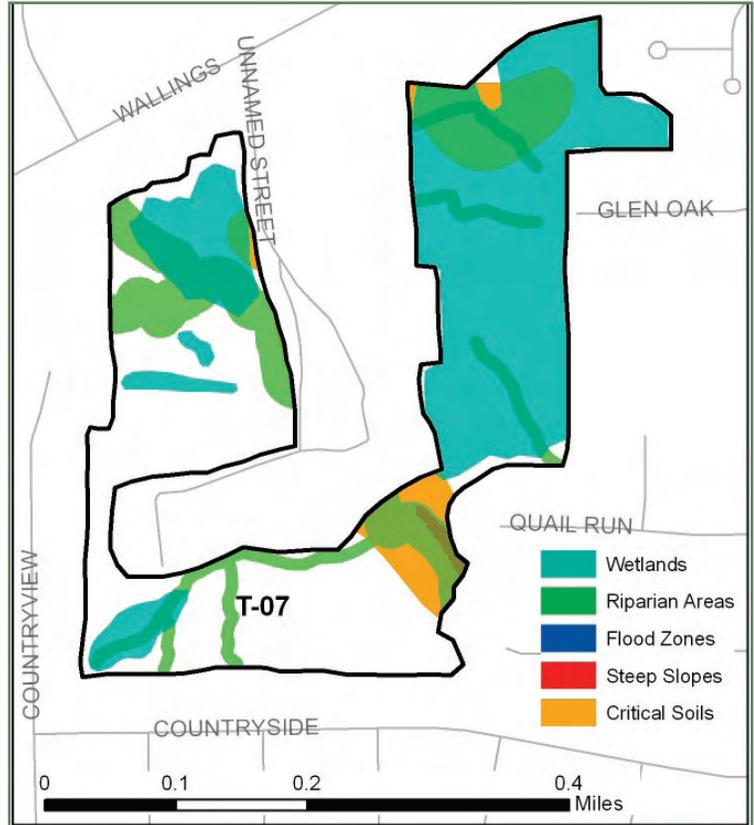
This area is located in the northwest portion of the Broadview Heights, south of Wallings Road and is heavily landlocked by surrounding homes.

The most notable feature at this site is the large wetland complex. Other features include primary headwaters streams, forested areas and a smaller amount of critical soils and steep slopes. Of the 63 acres, 23 acres (37%) of the site exists without any critical watershed features (\*calculation does not include forest cover).

This area is zoned for single family residential. Should housing development be targeted in this area, appropriate setback measures should be applied to the wetland and primary headwater complex.

Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T07
Total CCBT Acres	62.6
Number of Parcels	18
Critical Soils	8.1
Steep Slopes	0.3
Flood Zones	0.0
Streams	0.0
Headwater Stream	4.5
Forest	55.6
Wetlands	30.6
<b>Total</b>	<b>99.2</b>



# Undeveloped Area #01

(PCA - Conservation Development)

Large tract #01 is the fifteenth-largest open space area in the watershed with 58 acres.

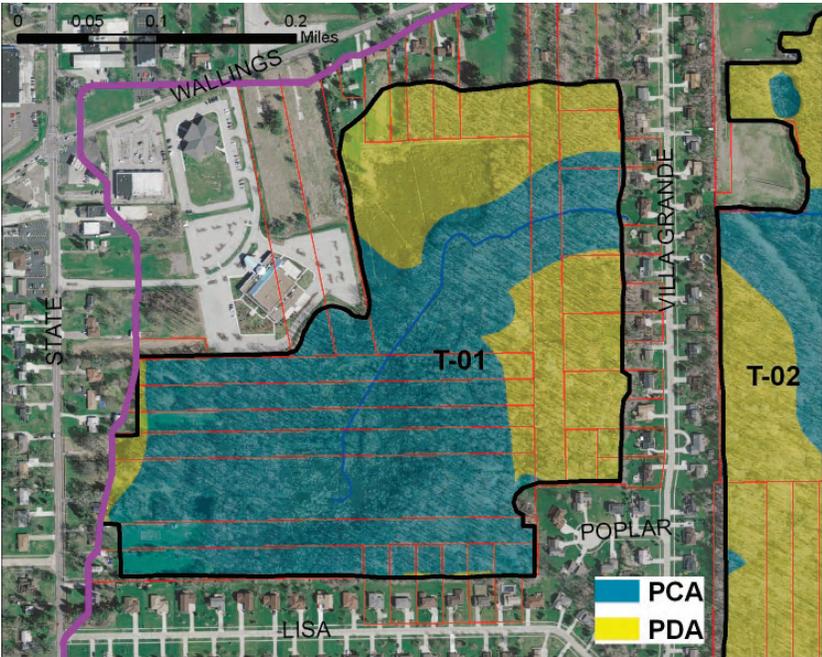
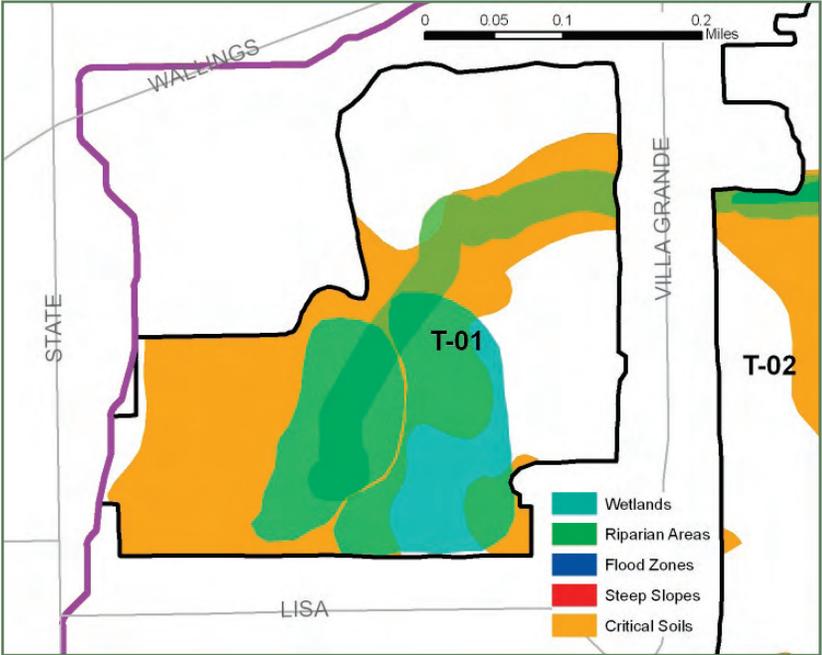
This area is located at the very headwaters of the watershed in the city of North Royalton, at Wallings Road and Villa Grande Drive.

The most notable feature in this area is the large wetland and stream complex. This is a good quality wetland, which currently provides stormwater management at the top of the watershed, closest to the source. Other features include densely-forested areas and critical soils.

Of the 58 acres, about 20 acres (34%) exists without critical watershed features (\*calculation does not include forest cover). This area is zoned single family residential.

Should housing development be targeted in this area, conservation development standards should be administered. Appropriate setback measures should be applied to the wetland and stream complex.

Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T01
Total CCBT Acres	58.3
Number of Parcels	32
Critical Soils	34.1
Steep Slopes	0.0
Flood Zones	0.0
Streams	7.1
Headwater Stream	0.0
Forest	50.4
Wetlands	17.3
<b>Total</b>	<b>108.9</b>

# Undeveloped Area #28

(PCA - Conservation Development)

Large tract #28 is the sixteenth largest open space area in the watershed with 53 acres.

This area is located along the northern border of Broadview Heights and is near E. Wallings and Wright Road.

The most notable feature in this site is the wetland complex. Previous surveys indicated this was a unique, high quality wetland. However, nearby development has reduced the size and possible quality of the wetland. Nonetheless, the wetland is still worthy of preservation and enhancement opportunities.

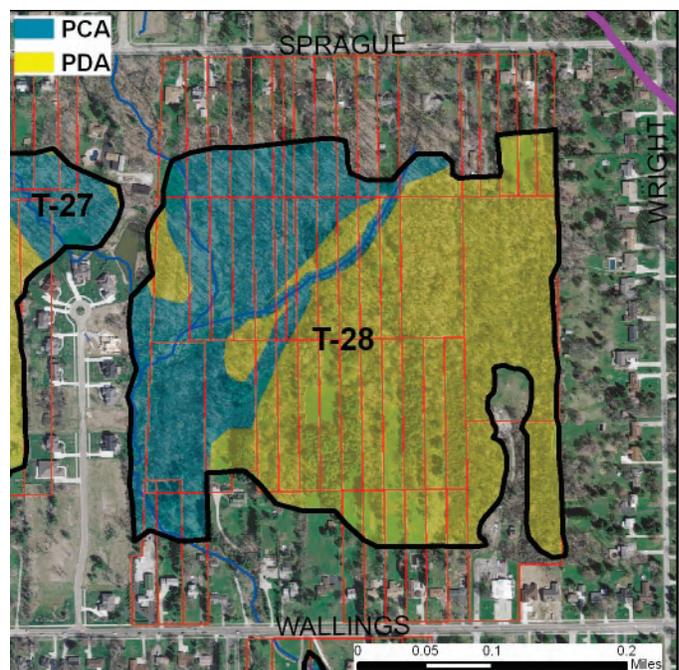
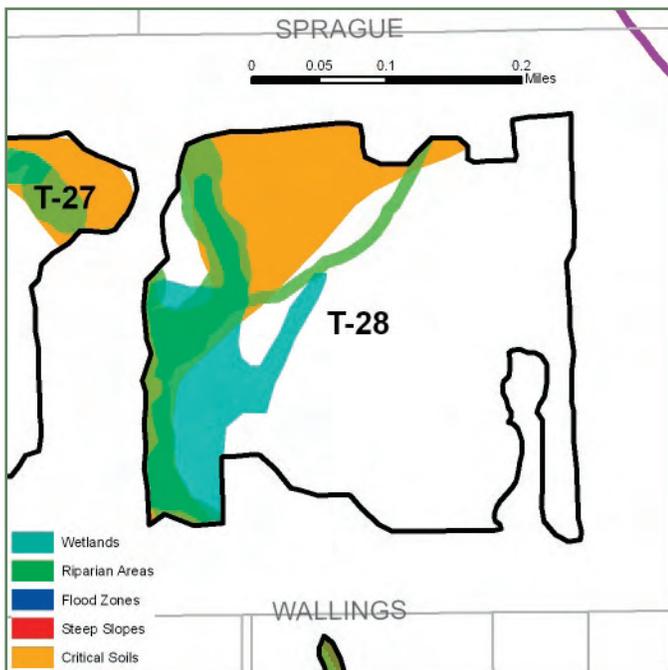
Other watershed features include primary headwater streams, forests and critical soils.

Of the 53 acres, 34 acres (64%) exist without any critical watershed features (\*calculation does not include forest cover).

This area is zoned single family residential. Should housing development be targeted in this area, conservation development standards should be administered. Appropriate setback measures should be applied to the wetland and stream complex.

Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T28
Total CCBT Acres	53.2
Number of Parcels	56
Critical Soils	13.1
Steep Slopes	0.0
Flood Zones	0.0
Streams	6.1
Headwater Stream	1.6
Forest	46.8
Wetlands	8.7
<b>Total</b>	<b>76.2</b>



# Undeveloped Area #29

(PCA - Conservation Development)

Large tract #29 is the seventeenth-largest open space area in the watershed with approximately 52 acres.

This area is located in the northeast portion of the city of Broadview Heights near E. Wallings Road and West Mill Road.

This area's notable features are a wetland complex and primary headwater stream. This site also has very good forest cover.

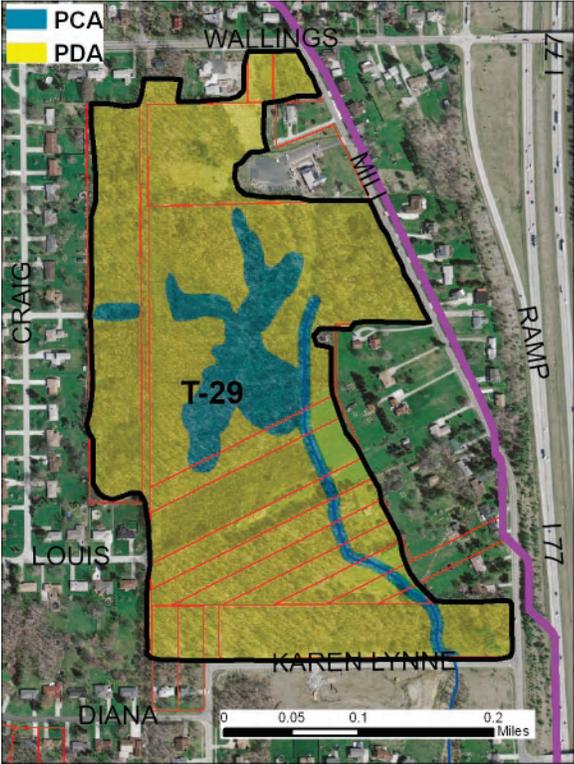
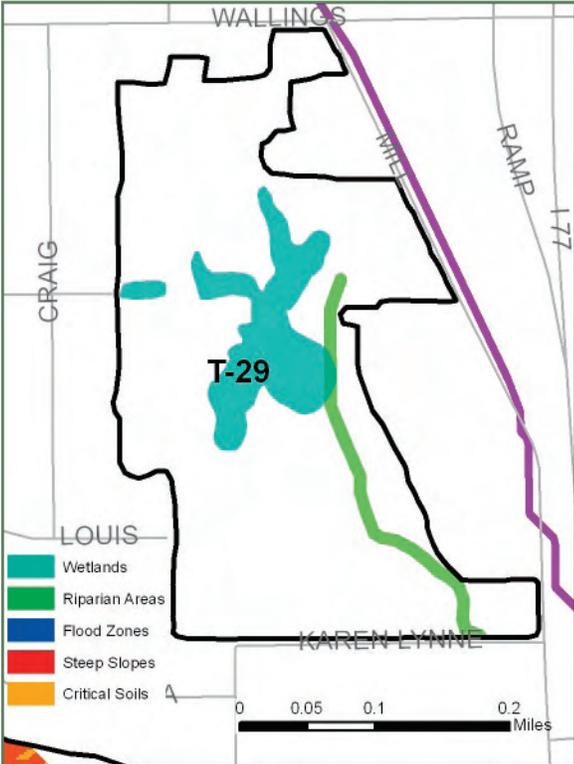
Of the 52 acres, 45 acres (85%) are without any critical watershed features (\*calculation does not include forest cover).

The southern portion of this area is zoned single family residential and northern is city property. Should housing development be targeted in this area, conservation development standards should be administered.

Appropriate setback measures should be applied to the wetland and stream complex.

Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T29
Total CCBT Acres	52.7
Number of Parcels	17
Critical Soils	0.0
Steep Slopes	0.0
Flood Zones	0.0
Streams	0.0
Headwater Stream	1.9
Forest	42.2
Wetlands	6
<b>Total</b>	<b>50.1</b>



# Undeveloped Area #17

(PCA - Conservation Development)

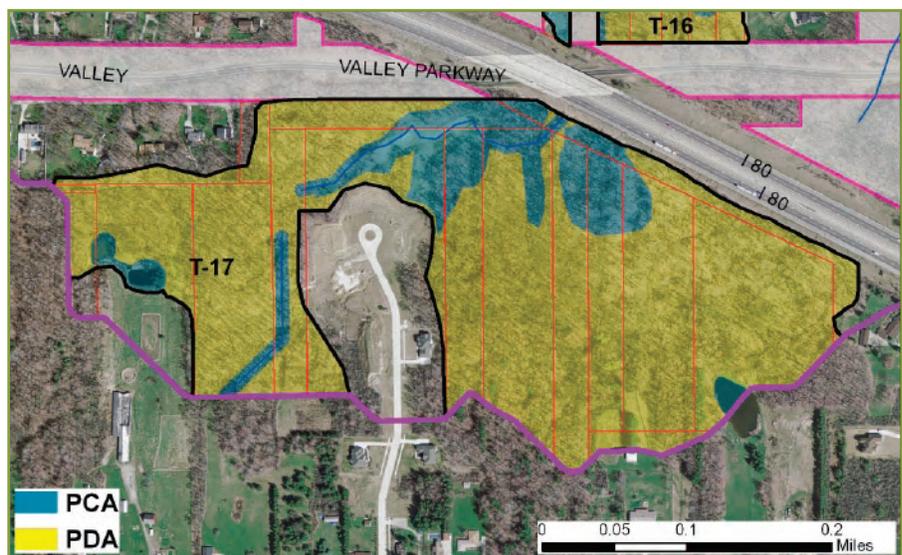
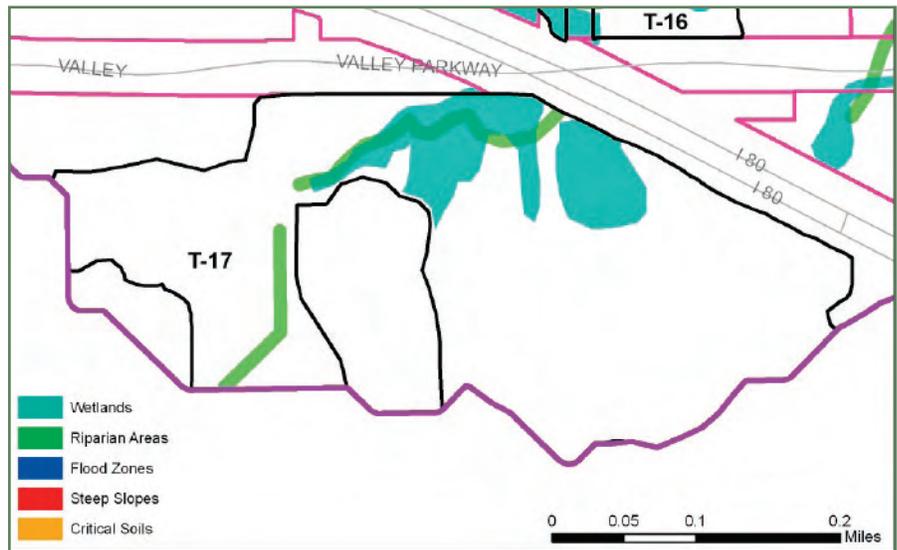
Large tract #17 is the eighteenth-largest open space area in the watershed with 50 acres.

This site is located on the border of Broadview Heights and North Royalton, just south of Interstate 80 and Metroparks Parkway. Note that since this site was identified, recent images show a small amount of residential development has begun.

This site is located at the very headwaters of the watershed near the watershed divide with the Rocky River. Notable features include a wetland and primary headwater complex and significant forested areas.

Of the 50 acres, 41 acres (83%) of the site exist without any critical watershed features (\*calculation does not include forest cover).

This site is zoned single family housing. Should housing development be targeted in this area, conservation development standards should be administered. Appropriate setback measures should be applied to the wetland and stream complex. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T17
Total CCBT Acres	50.1
Number of Parcels	17
Critical Soils	0.0
Steep Slopes	0.0
Flood Zones	0.0
Streams	0.0
Headwater Stream	2.1
Forest	44.2
Wetlands	6.7
<b>Total</b>	<b>53.1</b>

# Undeveloped Area #39

(PCA - Conservation Development)

Large tract #39 is the nineteenth-largest open space area in the watershed with approximately 49 acres.

This area is located in the city of Brecksville near the border of the Cleveland Metroparks' Brecksville Reservation.

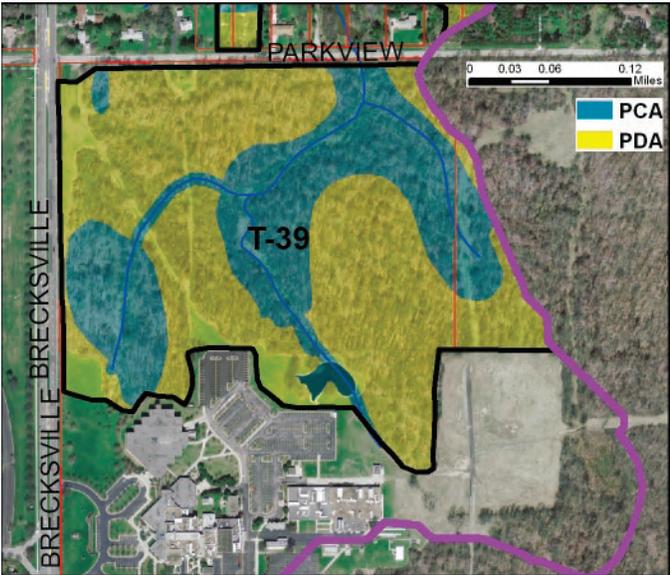
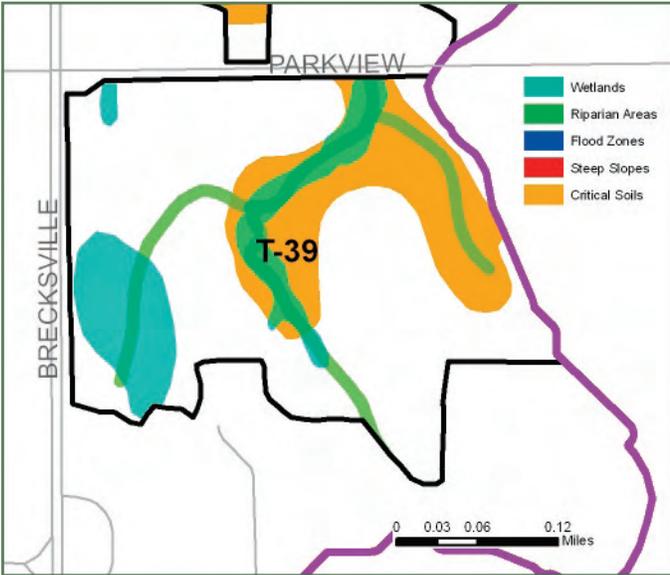
This large tract is in close proximity to another large tract (#38) and the Metroparks' reservation provides a good opportunity for preservation, green space and park connections.

Notable features at this site include a primary headwater and wetland complex, forested areas and some critical soils. Of the 49 acres, 31 acres (63%) exists without any critical watershed features (\*calculation does not include forest cover).

This area is zoned for office and laboratory. Should office park development be targeted in this area, conservation development standards should be administered.

Appropriate setback measures should be applied to the wetland and stream complex. Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques.

Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T39
Total CCBT Acres	49.7
Number of Parcels	2
Critical Soils	12.3
Steep Slopes	0.0
Flood Zones	0.0
Streams	0.0
Headwater Stream	4.3
Forest	46.9
Wetlands	8.2
<b>Total</b>	<b>71.6</b>

# Undeveloped Area #21

(PCA - Conservation Development)

Large tract #21 is the twentieth-largest open space area in the watershed with approximately 47 acres.

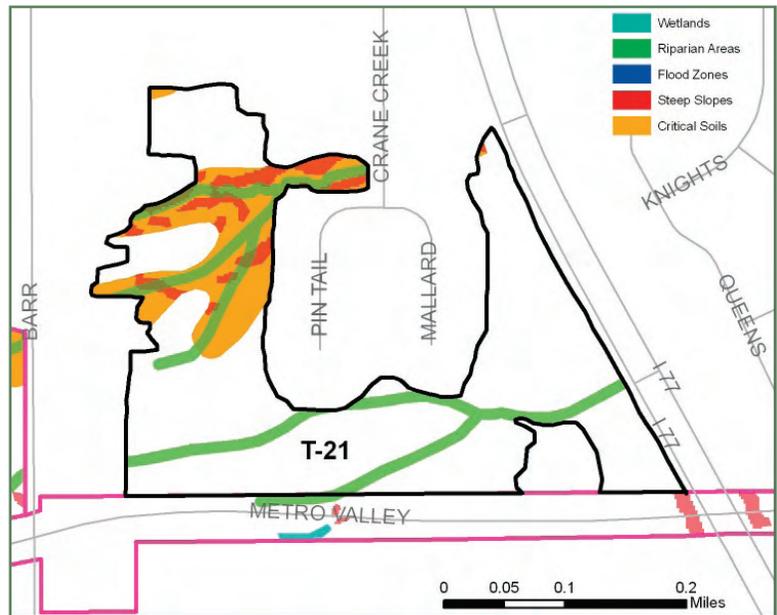
This area is located in the city of Brecksville where Interstate 77 and Metroparks Parkway intersect.

This area could be a good preservation opportunity with its close proximity to other park holdings.

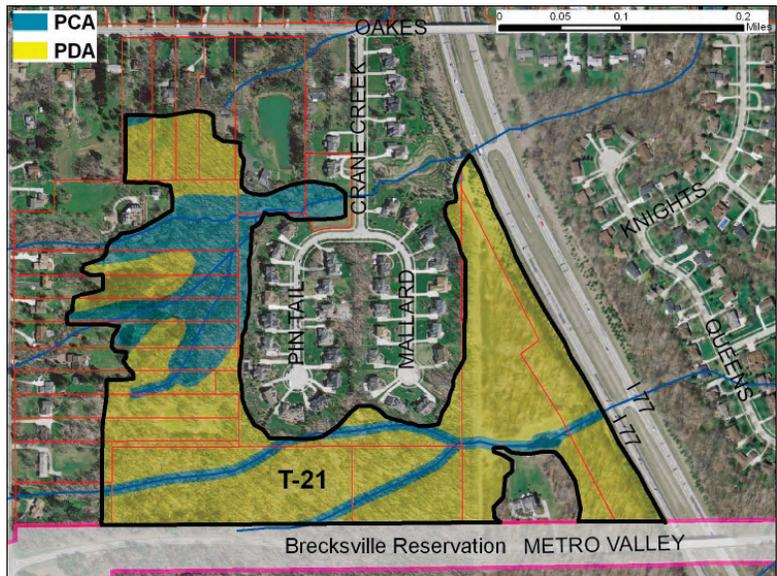
The most notable feature on this site is the primary headwater streams. Other features include forest, some critical soils and steep slopes.

Of the 47 acres, 35 acres (74%) exist without any critical watershed features (\*calculation does not include forest cover).

This area is zoned single family residential. Should housing development be targeted in this area, conservation development standards should be administered. Appropriate setback measures should be applied to the streams and steep slopes. Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T21
Total CCBT Acres	47.7
Number of Parcels	29
Critical Soils	8.9
Steep Slopes	2.3
Flood Zones	0.0
Streams	0.0
Headwater Stream	6.3
Forest	39.2
Wetlands	0
<b>Total</b>	<b>56.6</b>



# Undeveloped Area #16

(PCA - Conservation Development)

Large tract #16 is the twenty-first largest open space area in the watershed, approximately 45 acres.

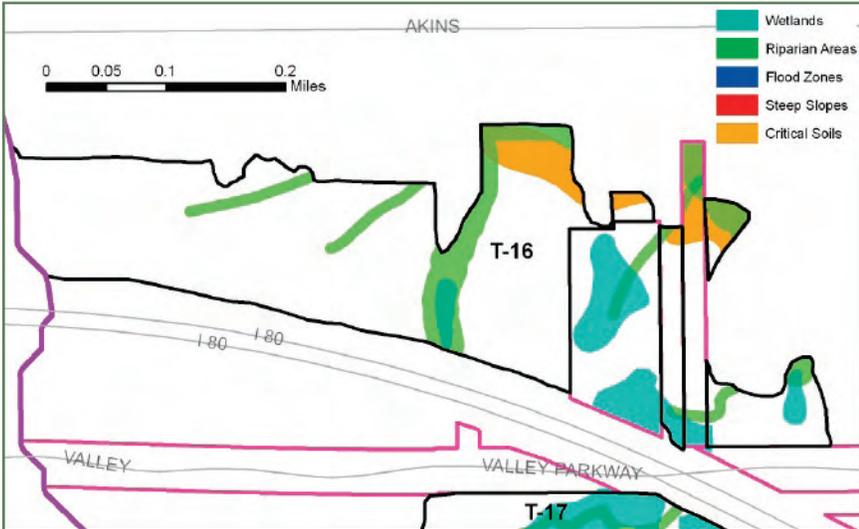
This area is located in both North Royalton and Broadview Heights adjacent to Metroparks Parkway and Interstate 80.

This area could be preserved for additional Metroparks land. Another possibility is to alleviate storm water runoff from Interstate-80 by incorporating management practices on site to detain and treat runoff.

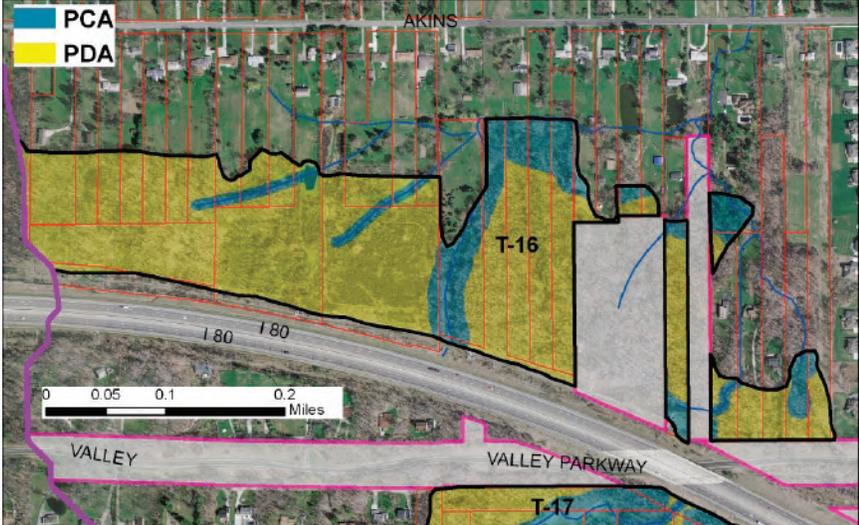
Notable features on site include streams, primary headwaters, wetlands, forested areas and a small portion of critical soils.

Of the 45 acres, 36 acres (81%) exist without any critical watershed features (\*calculation does not include forest cover).

This area is zoned single family residential in both communities. Should housing development be targeted in this area, conservation development standards should be administered.



Appropriate setback measures should be applied to the streams and wetlands. Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T16
Total CCBT Acres	44.9
Number of Parcels	36
Critical Soils	2.9
Steep Slopes	0.0
Flood Zones	0.0
Streams	4.1
Headwater Stream	1.7
Forest	41.5
Wetlands	2.6
<b>Total</b>	<b>52.8</b>

# Undeveloped Area #36

(PCA - Conservation Development)

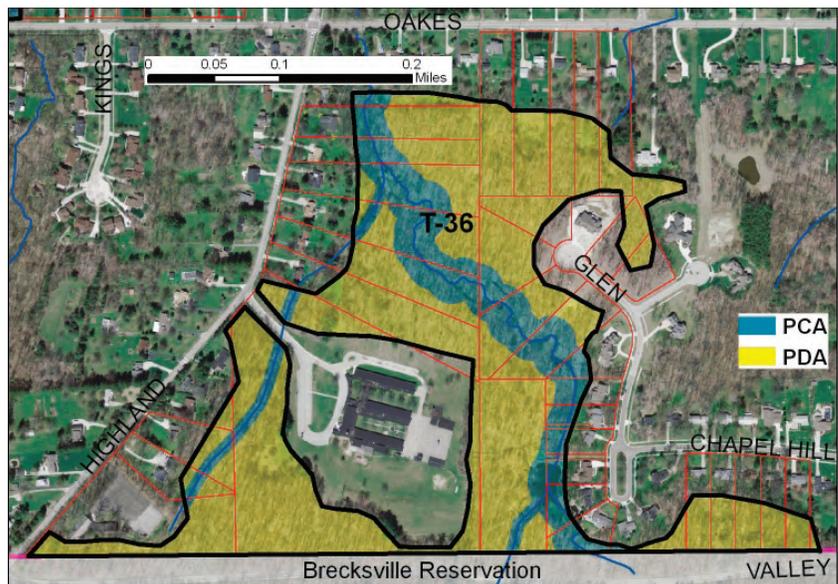
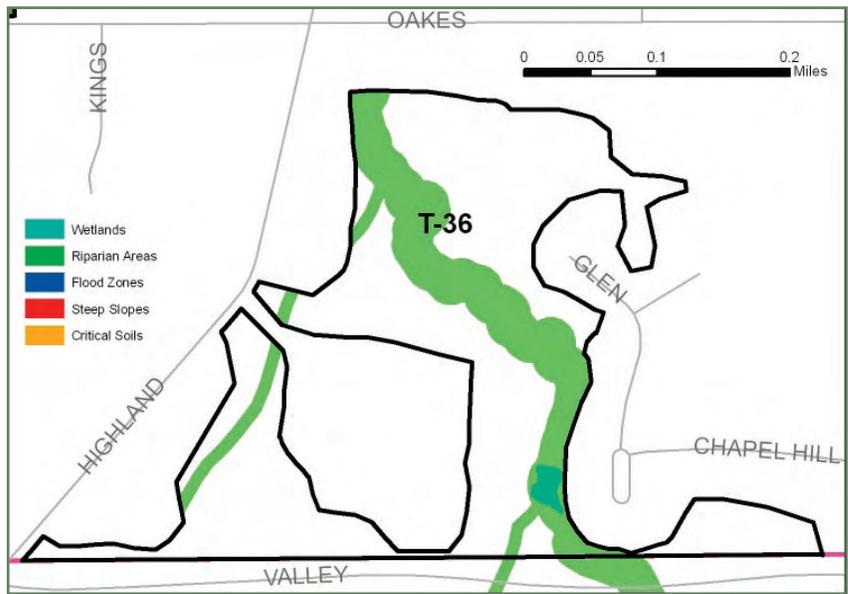
Large tract #36 is the twenty-second largest open space area in the watershed with 44 acres.

This area is located in the city of Brecksville at Highland Drive and Metroparks Parkway (or Valley Parkway). The close proximity to the Metroparks could provide some good preservation opportunities.

Notable watershed features on this site include forested areas, streams, primary headwaters and a small amount of wetlands.

Of the 44 acres, 34 acres (77%) exists without any critical watershed features (\*calculation does not include forest cover).

This area is zoned for single family. Should housing development be targeted in this area, conservation development standards should be administered. Appropriate setback measures should be applied to the streams and wetlands. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T36
Total CCBT Acres	44
Number of Parcels	35
Critical Soils	0.0
Steep Slopes	0.0
Flood Zones	0.0
Streams	8.4
Headwater Stream	1.8
Forest	39
Wetlands	0.4
<b>Total</b>	<b>49.7</b>

# Undeveloped Area #12 (PCA)

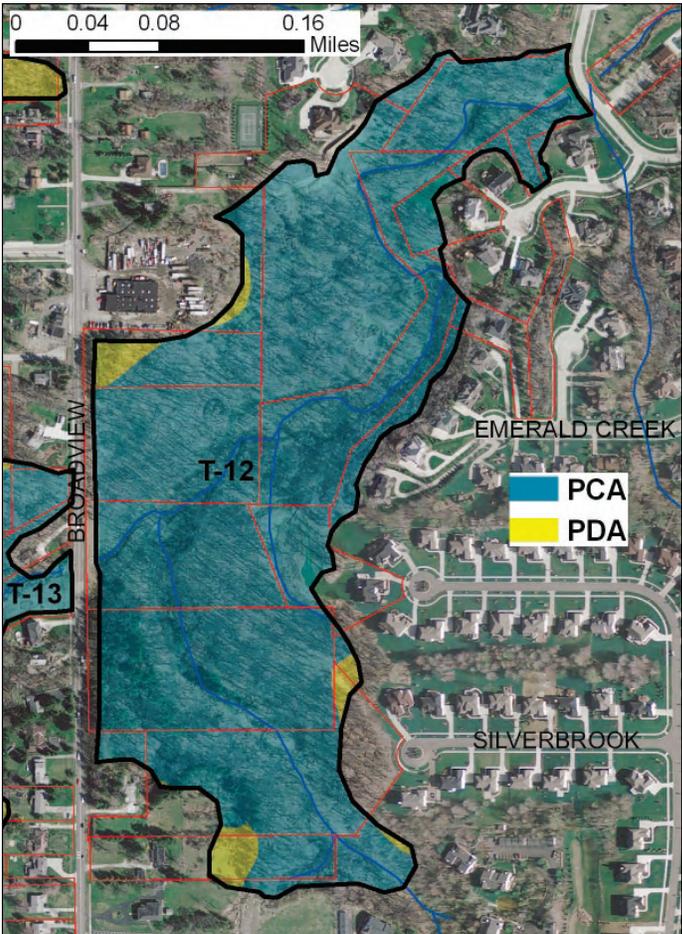
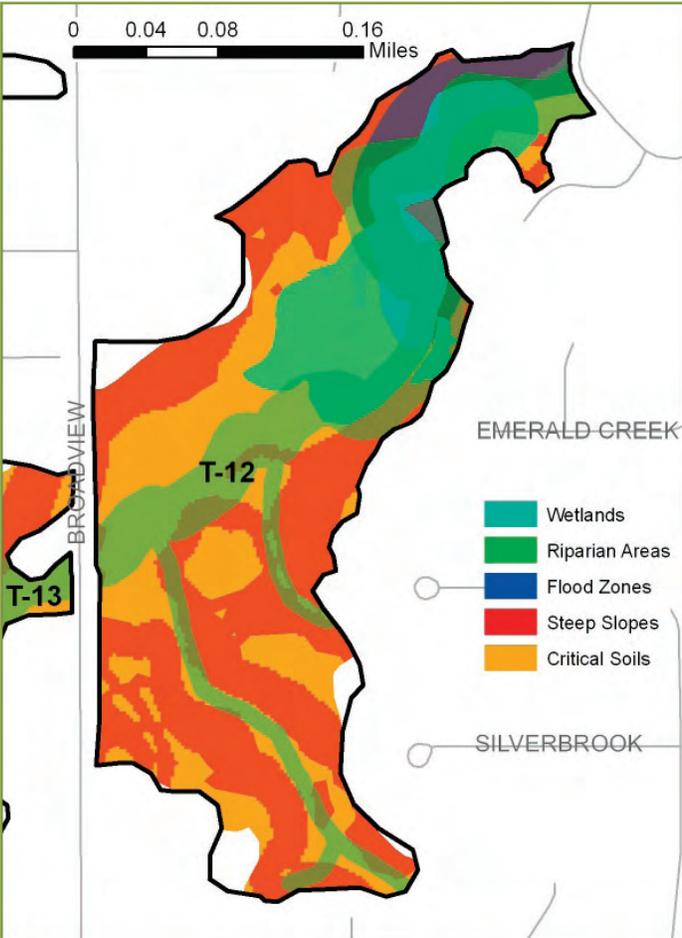
Large tract #12 is the twenty-third largest (out of 39) open space area in the watershed with 38 acres.

This area is located in the city of Broadview Heights just east of Broadview Road, near the Ledgemont Drive neighborhood.

This area follows a deep stream gorge and is in close proximity to other identified large tract areas (#13, #11). Large tract #12 could provide good opportunities for preservation, green space connections and enhancements to natural resources.

Of the 38 acres, only one acre (3%) exists without any critical watershed feature, leaving little space for development and difficult terrain for building (\*calculation does not include forest cover). This area is zoned single family housing. This area should remain undeveloped and explored for potential enhancement and restoration options.

Large Tract	T12
Total CCBT Acres	38.2
Number of Parcels	14
Critical Soils	36.9
Steep Slopes	17.6
Flood Zones	5.2
Streams	0.0
Headwater Stream	2.6
Forest	35.4
Wetlands	7.6
<b>Total</b>	<b>105.3</b>



# Undeveloped Area #06

(PCA - Conservation Development)

Large tract #06 is the twenty-fourth-largest open space area in the watershed with 38 acres.

This area is located in the city of Broadview Heights, near the intersection of Royalwood Road and Glengate Drive.

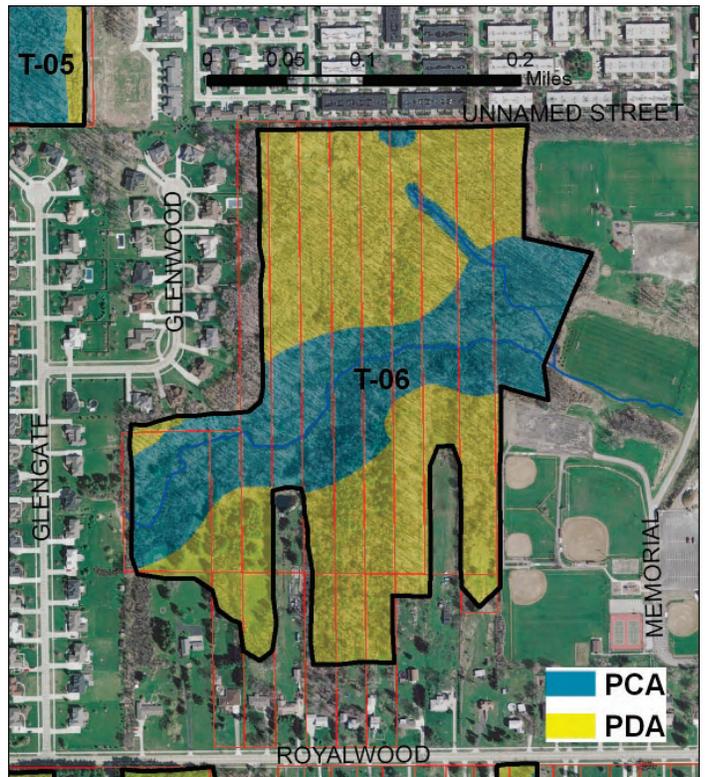
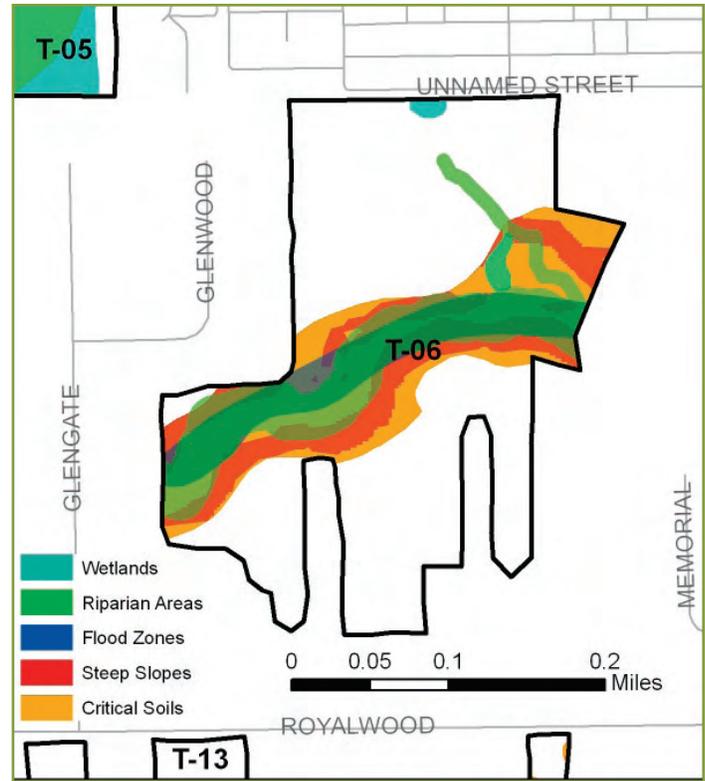
Large tract #06 is surrounded by roads and subdivisions, but is in close proximity to a community park and other open space areas, creating the possibility for green space connections.

Notable watershed features on site include: a large wetland complex, forested areas, streams, primary headwaters, flood zones, steep slopes and some critical soils.

Of the 38 acres, 24 acres (62%) exists without any critical watershed features (\*calculation does not include forest cover).

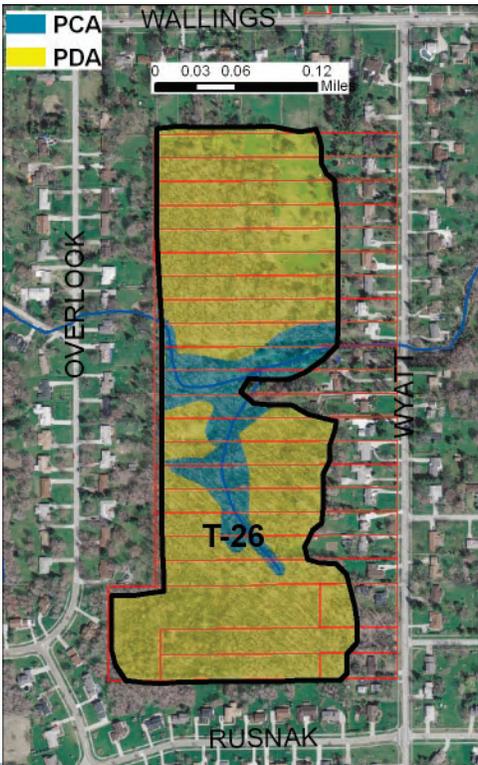
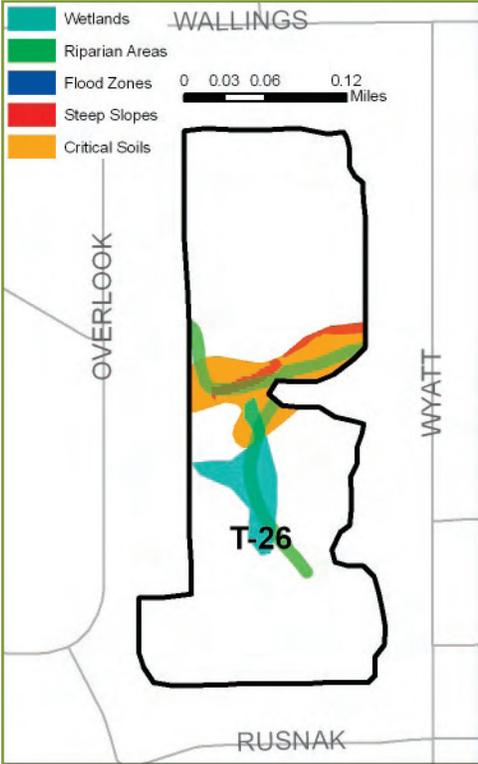
This area is zoned for single family housing. Should housing development be targeted in this area, conservation development standards should be administered. Appropriate setback measures should be applied to the large wetland complex, streams, flood zones and steep slopes. Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T06
Total CCBT Acres	38.2
Number of Parcels	16
Critical Soils	13.6
Steep Slopes	6.2
Flood Zones	4.8
Streams	6.7
Headwater Stream	0.9
Forest	36.5
Wetlands	32.8
<b>Total</b>	<b>101.5</b>



# Undeveloped Area #26

(PCA - Conservation Development)



Large tract #26 is the twenty-fifth-largest open space area in the watershed with 34 acres.

This area is located in the city of Broadview Heights, near the Lawrence School, between E. Wallings Road and Rusnak Trail.

One opportunity to consider is making this area into a science land lab for the Lawrence School.

Notable features on this site include: primary headwater streams, wetlands, forested areas, critical soils and a small amount of steep slopes.

Of the 34 acres, 29 acres (84%) exist without any critical watershed features (\*calculation does not include forest cover).

This area is zoned for single family housing. Should housing development be targeted in this area, conservation development standards should be administered.

Appropriate setback measures should be applied to the wetland, primary headwater stream and steep slopes. Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T26
Total CCBT Acres	34.3
Number of Parcels	24
Critical Soils	3.3
Steep Slopes	0.5
Flood Zones	0.0
Streams	0.0
Headwater Stream	1.9
Forest	28.8
Wetlands	1.7
<b>Total</b>	<b>36.2</b>

# Undeveloped Area #35

(PCA - Conservation Development)

Large tract #35 is the twenty-sixth-largest open space area in the watershed with 32 acres.

This area is located in the city of Brecksville, east of Highland Drive and just upstream of the Cleveland Metroparks' Brecksville Reservation.

Notable features on site include: forested areas, primary headwater streams, critical soils and steep slopes.

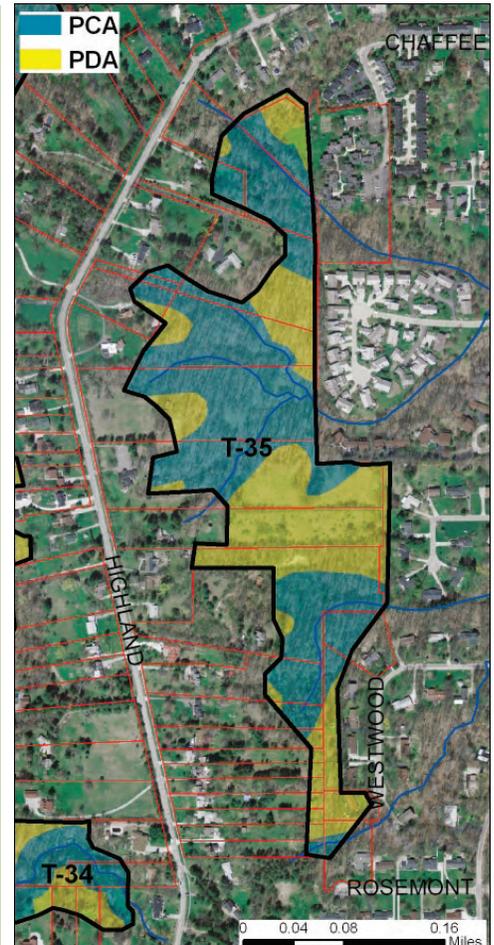
Of the 32 acres, 13 acres (41%) exist without any critical watershed feature (\*calculation does not include forest cover).

This area is zoned for single family housing. Should housing development be targeted in this area, conservation development standards should be administered.

Appropriate setback measures should be applied to the primary headwater stream and steep slopes. Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques.

Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T35
Total CCBT Acres	32.5
Number of Parcels	23
Critical Soils	18.9
Steep Slopes	9.0
Flood Zones	0.0
Streams	0.0
Headwater Stream	3.7
Forest	31.7
Wetlands	0.0
<b>Total</b>	<b>63.3</b>



# Undeveloped Area #19

(PCA - Conservation Development)

Large tract #19 is the twenty-seventh-largest open space area in the watershed with 31 acres.

This area is located in the city of Broadview Heights just north and adjacent to the Metroparks Parkway and some park land.

The old tree farm (Large Tract #20) is just to the east, providing some opportunity for preservation and green space connections.

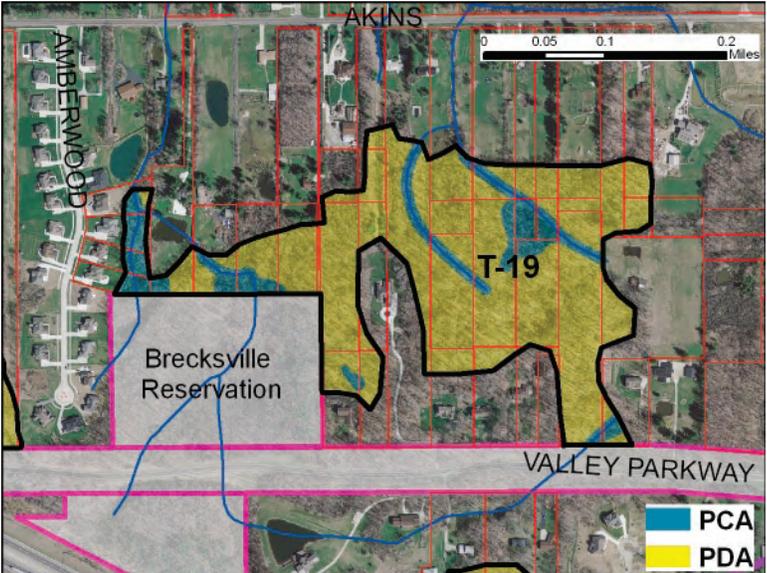
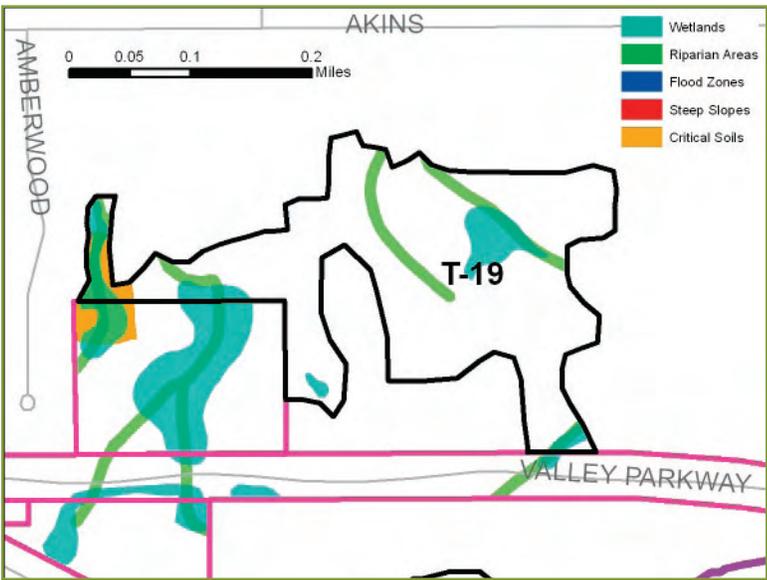
Notable features on this site include: large wetland complex, forested areas, primary headwater streams and a small amount of critical soils.

Of the 31 acres, 26 acres (83%) exists without any critical watershed features (\*calculation does not include forest cover).

This property is zoned for single family housing. Should housing development be targeted in this area, conservation development standards should be administered.

Appropriate setback measures should be applied to the wetland and primary headwater stream. Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques.

Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T19
Total CCBT Acres	31.9
Number of Parcels	38
Critical Soils	0.9
Steep Slopes	0.0
Flood Zones	0.0
Streams	0.0
Headwater Stream	3.0
Forest	30.9
Wetlands	8.3
<b>Total</b>	<b>43.1</b>

# Undeveloped Area #27

(PCA - Conservation Development)

Large tract #27 is the twenty-eighth largest open space area in the watershed with 26 acres.

This area is located in Broadview Heights near the northern boundary line with Seven Hills. Other green spaces exist nearby (i.e. Large Tract #28) creating some opportunities for preservation and green space connections for the surrounding neighborhoods.

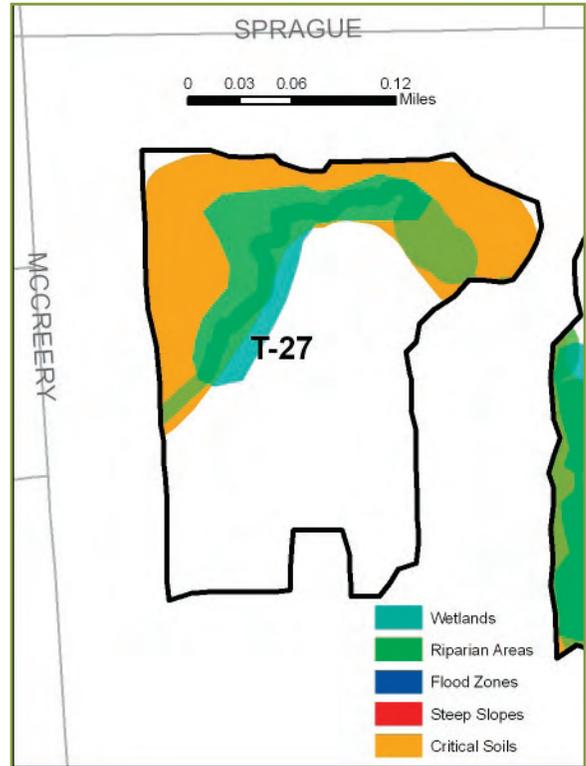
Notable features on site include: wetlands, streams and primary headwaters, forested areas and critical soils.

Of the 26 acres, 14 acres (57%) exist without any critical watershed features (\*calculation does not include forest cover).

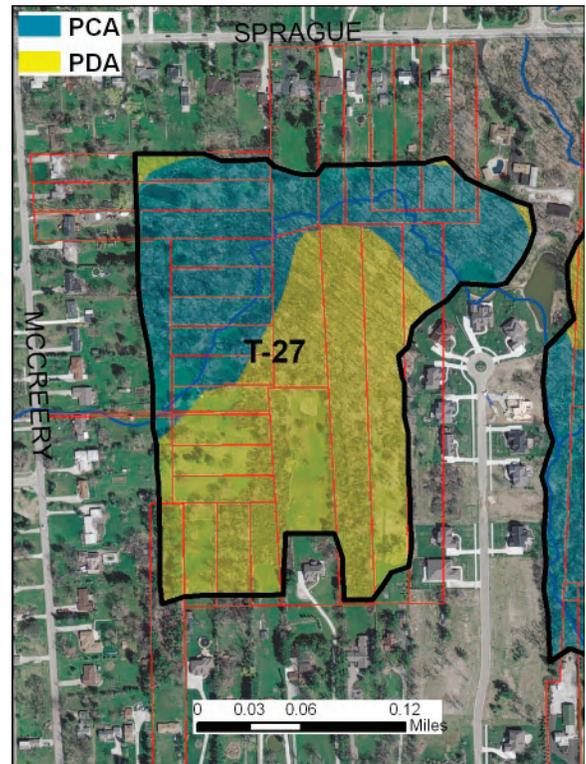
This property is zoned for single family housing. Should housing development be targeted in this area, conservation development standards should be administered. Appropriate setback measures should be applied to the wetland and streams.

Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques.

Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

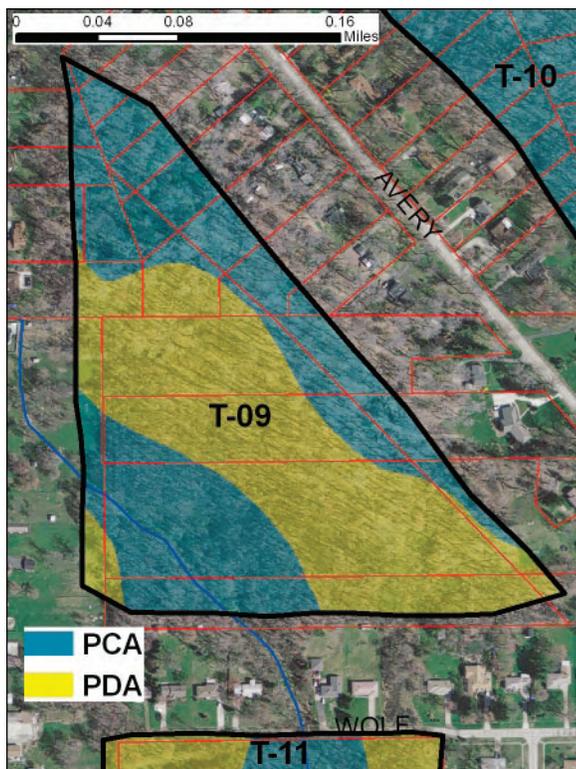
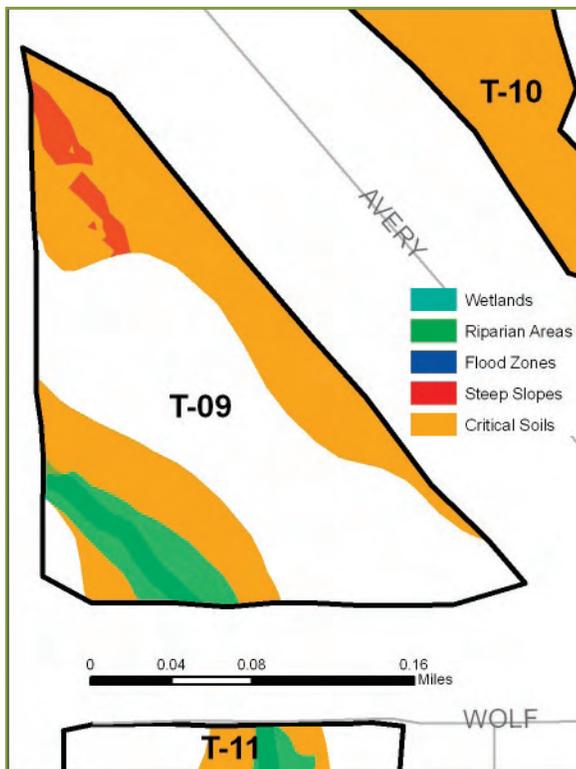


Large Tract	T27
Total CCBT Acres	26.1
Number of Parcels	29
Critical Soils	10.6
Steep Slopes	0.0
Flood Zones	0.0
Streams	1.1
Headwater Stream	1.9
Forest	22
Wetlands	4.1
<b>Total</b>	<b>39.6</b>



# Undeveloped Area #09

(PCA - Conservation Development)



Large tract #09 is the twenty-ninth-largest open space area in the watershed with 22 acres.

This area is located in the city of Broadview Heights near the intersection of Avery and Broadview Roads.

This open space is largely landlocked, but could prove to be a good area for conservation easements among the home owners, and wetland enhancements.

Notable features on site include: wetlands, primary headwater stream, forested area, critical soils and a small amount of steep slopes.

Of the 22 acres, 11 acres (49%) exists without any critical watershed features (\*calculation does not include forest cover).

This property is zoned for single family housing. Should housing development be targeted in this area, conservation development standards should be administered.

Appropriate setback measures should be applied to the wetland and stream. Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques.

Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

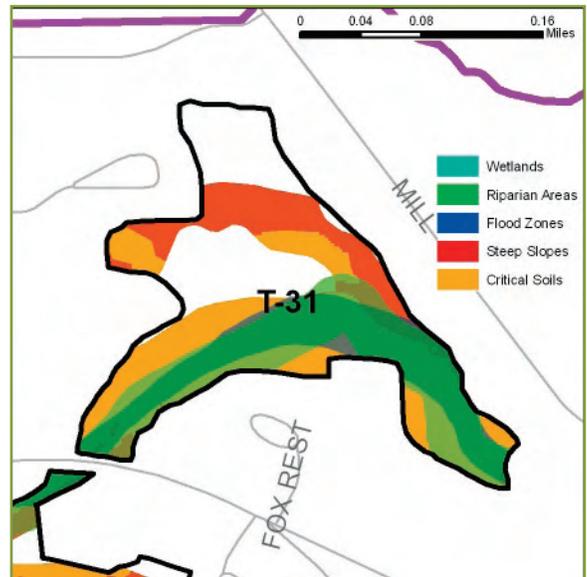
Large Tract	T09
Total CCBT Acres	22.9
Number of Parcels	24
Critical Soils	11.5
Steep Slopes	0.6
Flood Zones	0.0
Streams	0.0
Headwater Stream	.6
Forest	22.3
Wetlands	1.8
<b>Total</b>	<b>36.8</b>

# Undeveloped Area #17

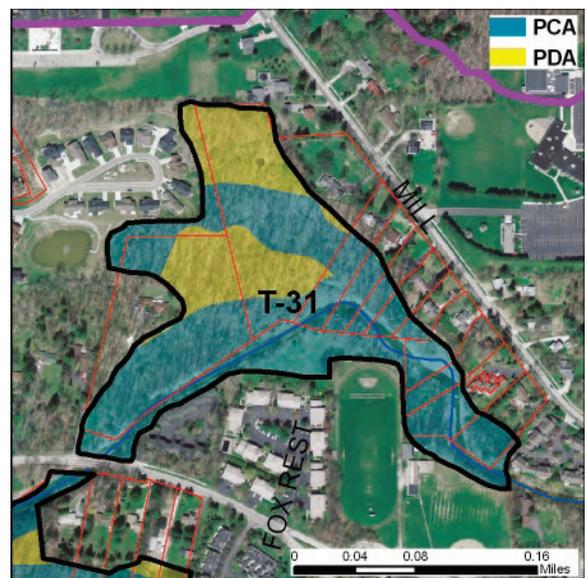
(PCA - Conservation Development)

## Undeveloped Land #31 (PCA- Landlocked)

Large tract #31 is the thirtieth largest open space area in the watershed with 18 acres. This area is located in the city of Brecksville, along the Chippewa Creek mainstem, near the intersection of Old Royalton Road and Long Forest Drive. Large tract #31 is both landlocked and exhibits some difficult terrain, which probably makes it a low priority for development and conservation effort. However, some notable features on site include close proximity to the mainstem of Chippewa Creek, flood zones, critical soils and steep slopes. Of the 18 acres, only 4 acres (26%) exist without any critical watershed features, making it less suitable for development (\*calculation does not include forest cover). This area falls under multiple zoning categories: Single family, Single Family- Detached / Semi-Attached and a small portion is zoned Office Building. Due to the site's constraints: small, land locked, difficult terrain and flood prone, this area should remain undeveloped.



Large Tract	T31
Total CCBT Acres	18.2
Number of Parcels	11
Critical Soils	13.3
Steep Slopes	3.3
Flood Zones	5.2
Streams	0.0
Headwater Stream	0.0
Forest	10.6
Wetlands	0
<b>Total</b>	<b>32.4</b>



# Undeveloped Area #38

(PCA - Conservation Development)

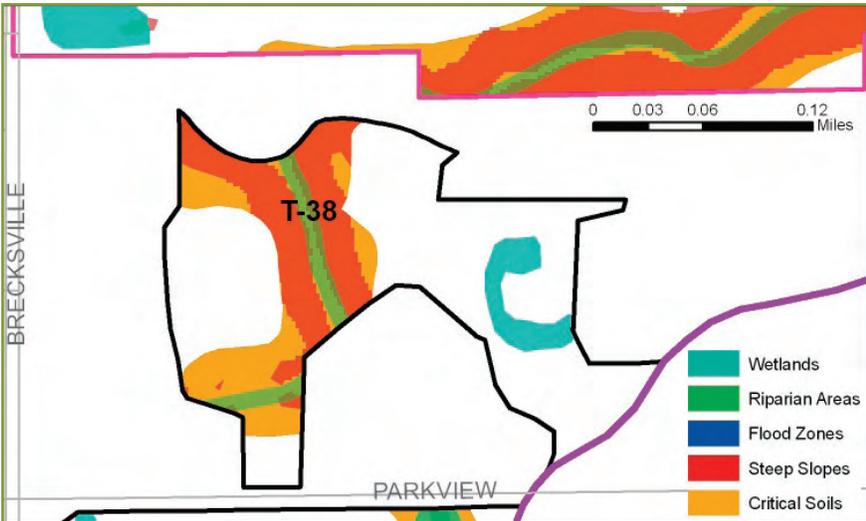
Large tract #38 is the thirty-first-largest open space area in the watershed with 18 acres.

This area is located in the city of Brecksville between Parkview Road and the Valley Parkway.

This property is also uniquely located next to the Cleveland Metroparks' Brecksville Reservation, which creates some park expansion opportunities by linking this property with another large tract (#39).

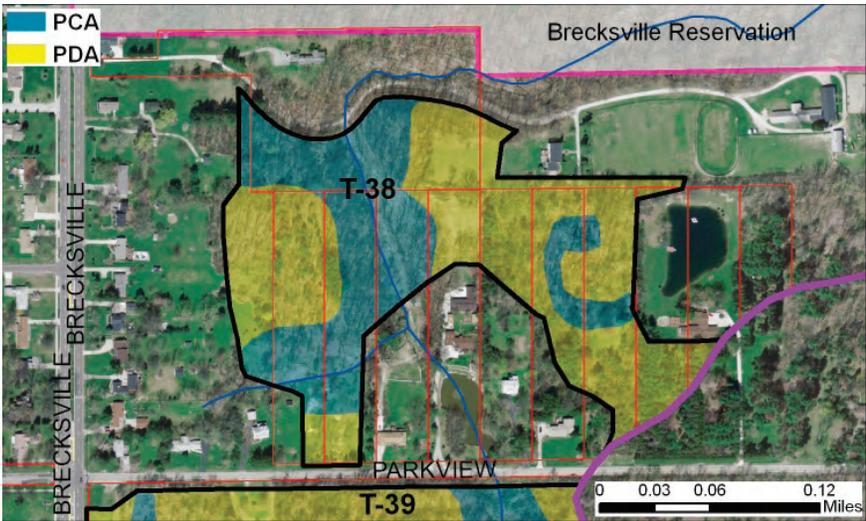
Notable features on this site include: wetlands, primary headwater stream, steep slopes, critical soils and forested areas.

Of the 18 acres, 11 acres (61%) exist without any critical watershed features (\*calculation does not include forest cover).



This area is zoned single family housing. Should housing development be targeted in this area, conservation development standards should be administered to protect the Metroparks' downstream resources.

Appropriate setback measures should be applied to the wetland, stream and steep slopes Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T38
Total CCBT Acres	18.2
Number of Parcels	11
Critical Soils	6.2
Steep Slopes	3.4
Flood Zones	0.0
Streams	0.0
Headwater Stream	.9
Forest	16.0
Wetlands	.9
<b>Total</b>	<b>27.4</b>

# Undeveloped Area #32

(PCA - Landlocked)

Large tract #32 is the thirty-second-largest (out of 39) open space area in the watershed with 16 acres.

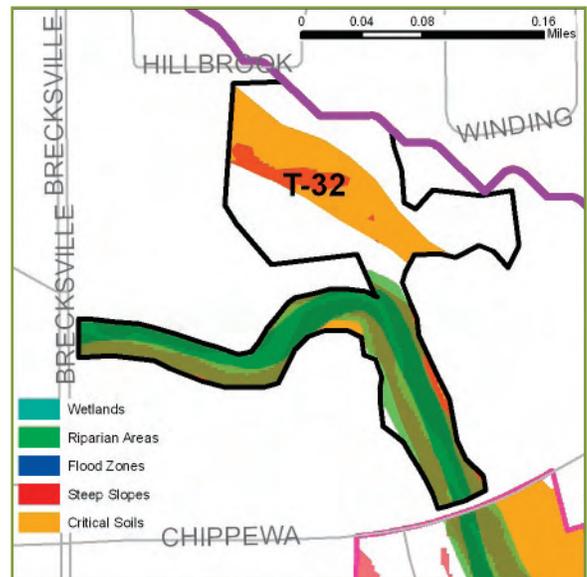
This area is located in the city of Brecksville near the Hillbrook Oval neighborhood and the mainstem of Chippewa Creek.

This small property is largely land locked by housing and industry and has some difficult terrain (flood zones), all of which limits the potential for development.

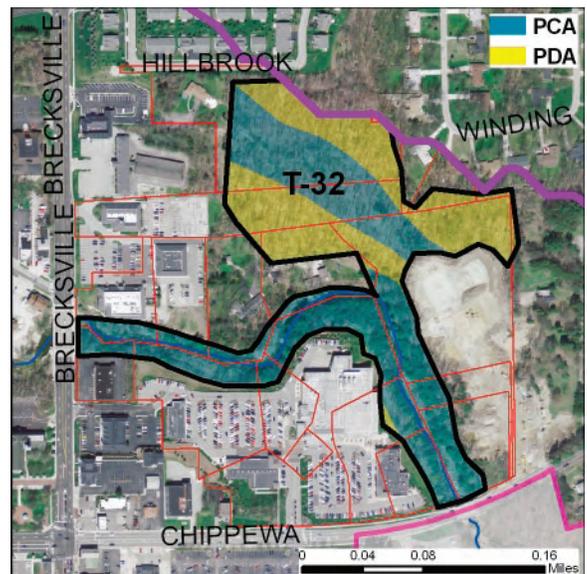
However, some notable features on site include close proximity to the mainstem of Chippewa Creek, flood zones, critical soils, steep slopes and forest.

Of the 16 acres, 6 acres (37%) exists without any critical watershed features (\*calculation does not include forest cover).

This area is zoned for single family housing. Due to the site's constraints: small, land locked, difficult terrain and flood prone, development pressure will be minimal and should remain undeveloped.



Large Tract	T32
Total CCBT Acres	16.1
Number of Parcels	16
Critical Soils	9.7
Steep Slopes	5.0
Flood Zones	3.3
Streams	0.0
Headwater Stream	0.0
Forest	14.1
Wetlands	0
<b>Total</b>	<b>32.0</b>



# Undeveloped Area #25

(PCA - Landlocked)

Large tract #25 is the thirty-third largest open space area in the watershed with 15 acres.

This area is located in the city of Broadview Heights near the intersection of East Wallings and Joyce Road.

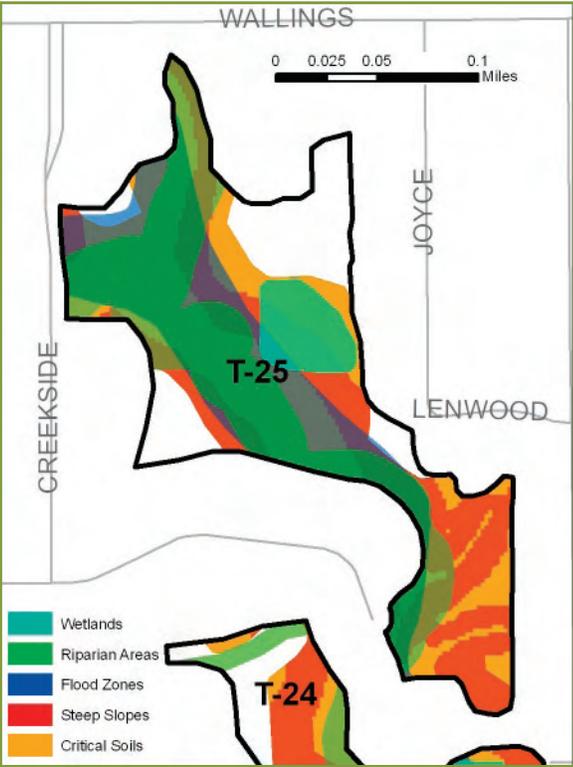
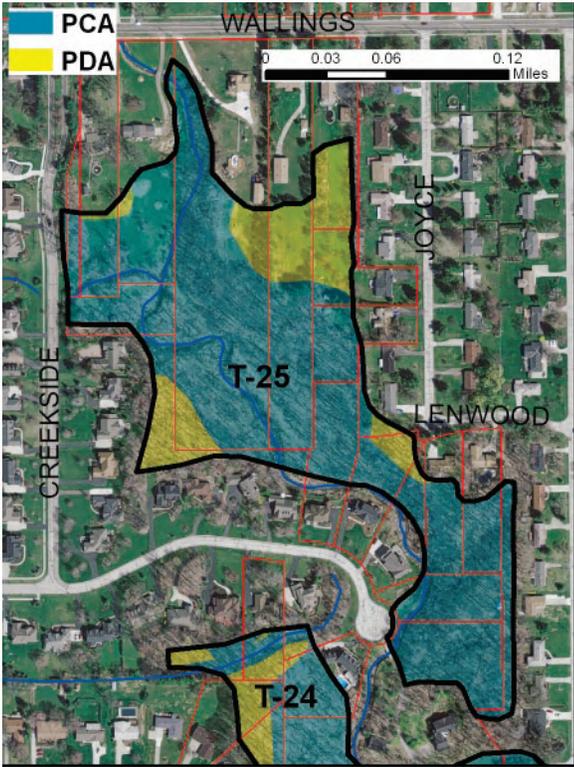
This open space is composed of the back lots from the surrounding neighborhood and has excellent green space connection potential with the adjacent Large Tract #24.

The notable features on this site include: wetlands, forested areas, streams, flood zones, steep slopes and critical soils.

Of the 15 acres, only 2 acres (17%) exists without any watershed features (\*calculation does not include forest cover).

This property is zoned single family housing. Due to the site's constraints: small, land locked, difficult terrain and flood prone, development pressure will be minimal and should remain undeveloped.

Large Tract	T25
Total CCBT Acres	15.8
Number of Parcels	15
Critical Soils	12.8
Steep Slopes	5.8
Flood Zones	6.7
Streams	6.3
Headwater Stream	0.0
Forest	10.3
Wetlands	1.1
<b>Total</b>	<b>43</b>



# Undeveloped Area #33

(PCA - Conservation Development)

Large tract #33 is the thirty-fourth largest open space area in the watershed with 15 acres.

This area is located in the city of Brecksville between Royalton Road and Old Royalton Road and stretches along a portion of the Chippewa Creek mainstem.

Potential preservation and green space connections are possible with nearby large tracts # 30 & #24.

Notable features on site include: forest, stream, flood zones, steep slopes and critical soils.

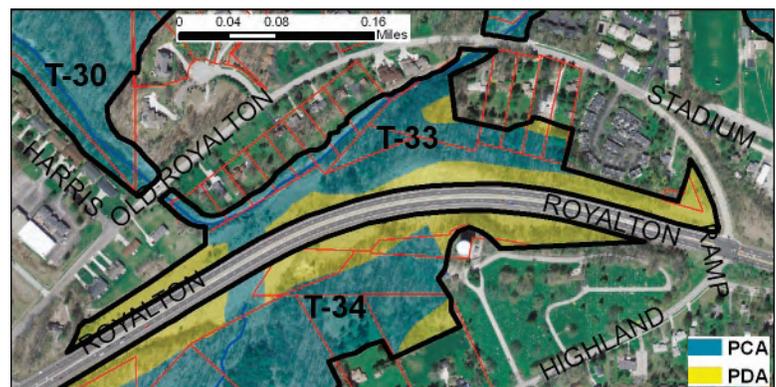
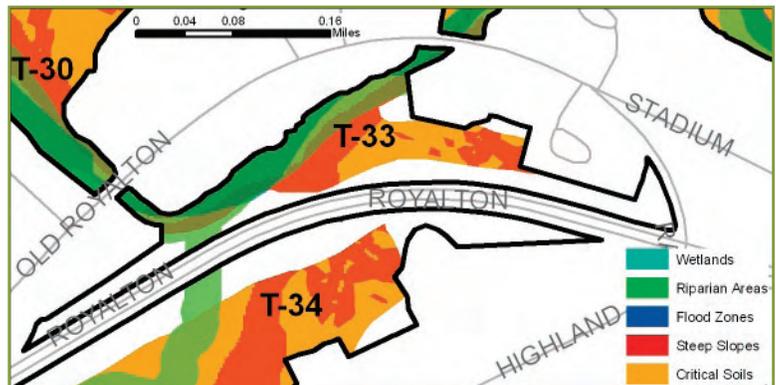
Of the 15 acres, 6 acres (40%) exists without any critical watershed features (\*calculation does not include forest cover).

This property has some difficult terrain (eg. nearby creek valley) and its landlocked location may limit development pressures.

This area is zoned single family housing. Should housing development be targeted in this area, conservation development standards should be administered.

Appropriate setback measures should be applied to the stream, steep slopes and flood zone. Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T33
Total CCBT Acres	15
Number of Parcels	16
Critical Soils	8.6
Steep Slopes	4.1
Flood Zones	2.4
Streams	0.2
Headwater Stream	0.0
Forest	7.1
Wetlands	0
<b>Total</b>	<b>22.4</b>



# Undeveloped Area #03

(PCA - Conservation Development)

Large tract #03 is the thirty-fifth largest open space areas in the watershed 14 acres.

This area is located in the city of Broadview Heights, at the border with North Royalton, and is near the intersection of Lydia Drive and Falls Lane.

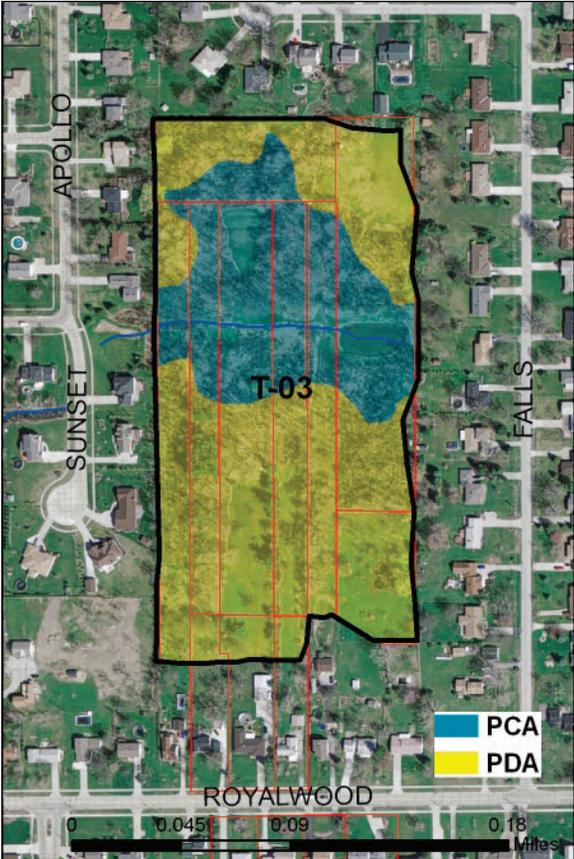
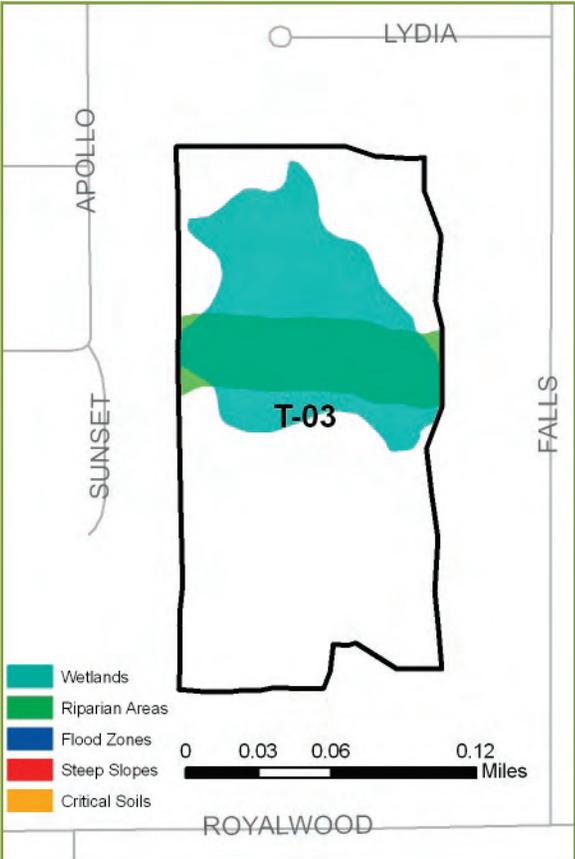
Notable features on site include: a relatively large wetland worthy of preservation and enhancements and forested areas.

Of the 14 acres, approximately 9 acres exist without any critical watershed features (\*calculation does not include forest cover).

This area is zoned single family residential. Should housing development be targeted in this area, conservation development standards should be administered.

Appropriate setback measures should be applied to the wetland complex. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T03
Total CCBT Acres	14.7
Number of Parcels	11
Critical Soils	0.0
Steep Slopes	0.0
Flood Zones	0.0
Streams	0.0
Headwater Stream	0.0
Forest	13.4
Wetlands	4.9
<b>Total</b>	<b>43</b>



# Undeveloped Area #40

(PCA - Conservation Development)

Large tract #40 is the thirty-sixth largest open space area in the watershed with 14 acres.

This area is located in the city Broadview Heights and is near Broadview Road and Lazzaro Boulevard.

Notable features on site include stream and flood zones, steep slopes, forest and critical soils.

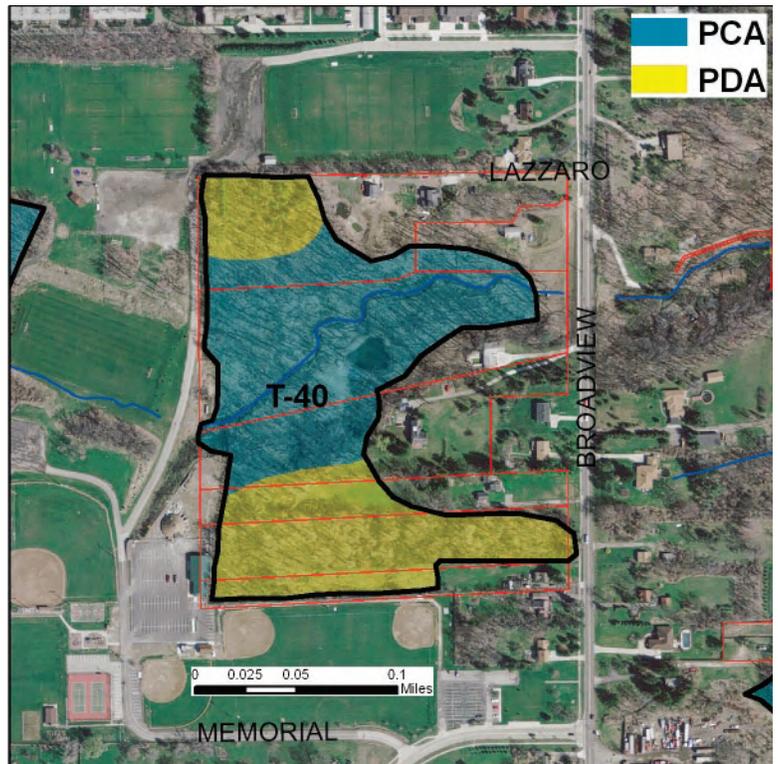
Of the 14 acres, approximately 6 acres (44%) exist without any critical watershed features (\*calculation does not include forest cover).

This area is zoned single family housing. Should housing development be targeted in this area, conservation development standards should be administered.

Appropriate setback measures should be applied to the stream, steep slopes and flood zone. Areas of a site with critical soils should be conserved as much as possible, with limited compaction through low impact development techniques.

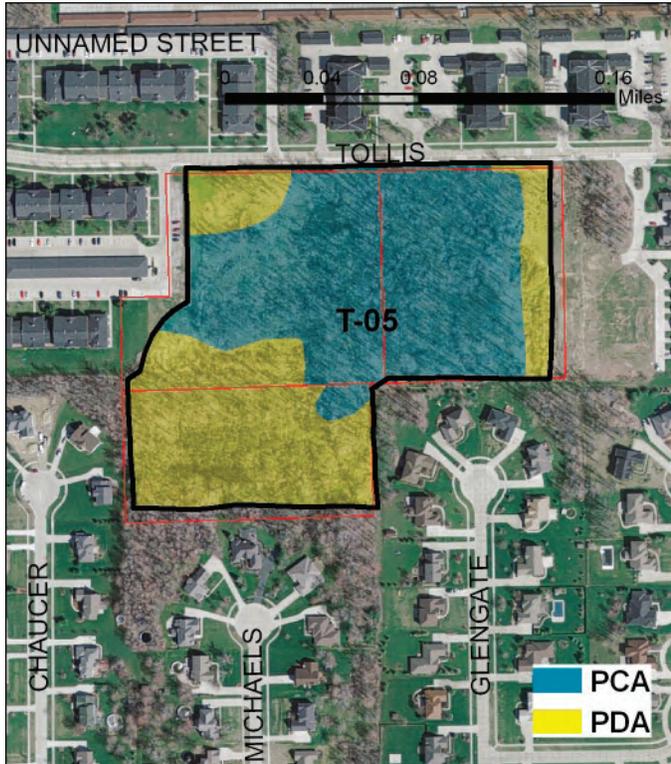
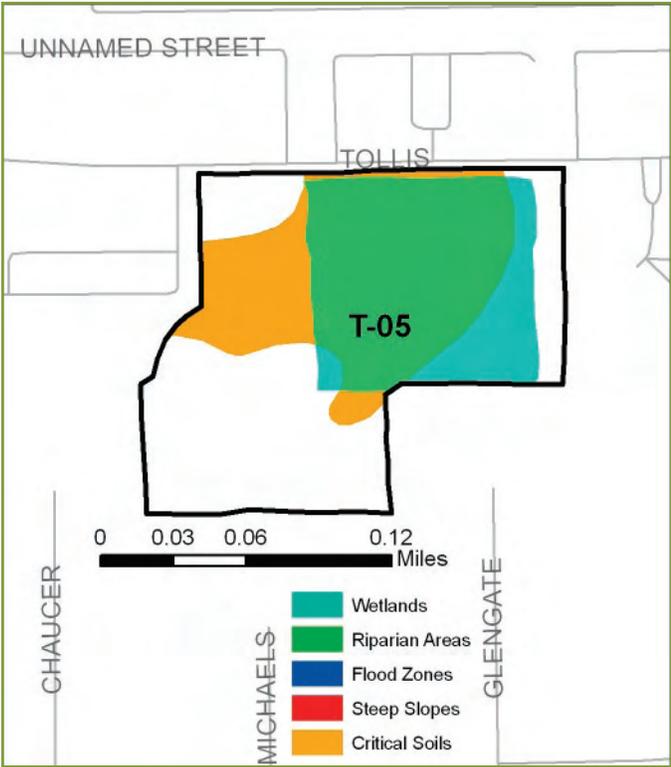
Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T40
Total CCBT Acres	14.2
Number of Parcels	7
Critical Soils	7.9
Steep Slopes	2.7
Flood Zones	3.0
Streams	3.7
Headwater Stream	0.0
Forest	12.9
Wetlands	0
<b>Total</b>	<b>30.3</b>



# Undeveloped Area #05

(PCA - Conservation Development)



Large tract #05 is the thirty-seventh largest open space area in the watershed with 12 acres.

This area is located in the city of Broadview Heights, at the end of Glengate Drive and Michaels Lane.

The property's close proximity to other large tracts and a municipal park (#06 & #40) provide some good possibilities for green space preservation and greenway trails systems.

Notable features on site include: a relatively large wetland complex, forested areas and critical soils.

Of the 12 acres, 5 acres (43%) exists without any critical watershed features (\*calculation does not include forest cover).

This area is zoned apartments- low density. Should apartment development be targeted in this area, a conservation development or low impact development standard should be administered. Appropriate setback measures should be applied to

the wetland complex. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.

Large Tract	T05
Total CCBT Acres	12.1
Number of Parcels	3
Critical Soils	5.7
Steep Slopes	0.0
Flood Zones	0.0
Streams	0.0
Headwater Stream	0.0
Forest	10.8
Wetlands	5.1
<b>Total</b>	<b>21.6</b>

# Undeveloped Area #10

(PCA - Restoration)

Large tract #10 is the thirty- eighth largest open space area in the watershed with 11 acres.

This area is located in the city of Broadview Heights near the intersection of Woodmere Drive and Chestnut Boulevard.

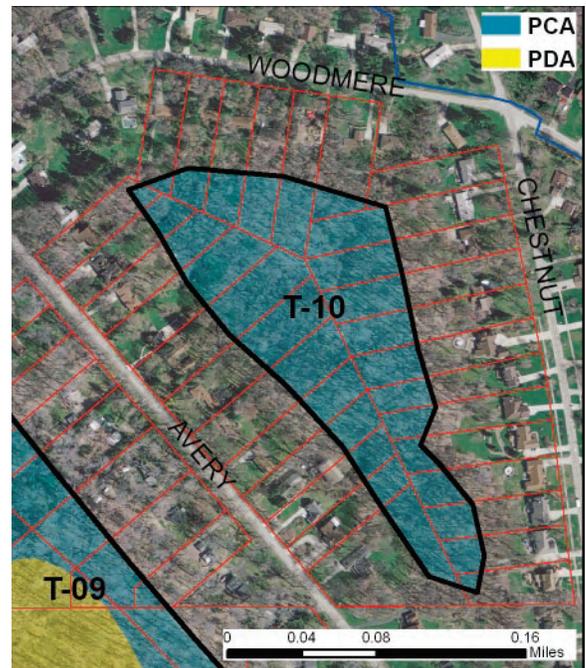
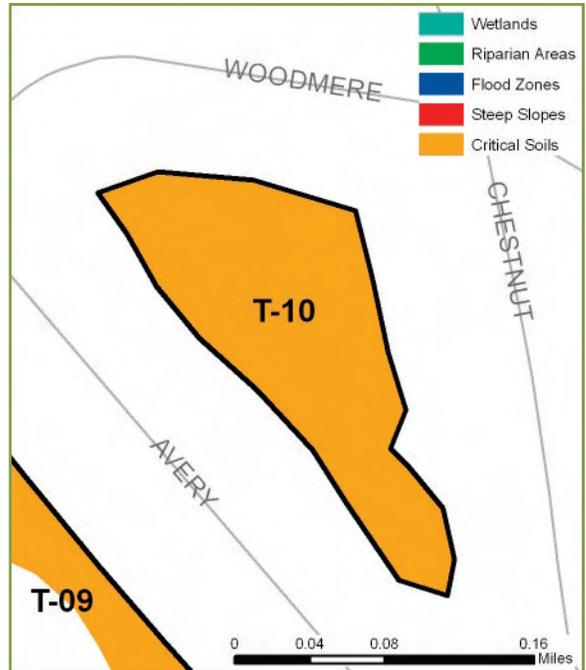
While this area is somewhat isolated there are some good opportunities for preservation. Large, backlot properties separate large tract #10 from large tract #23. Pursuing conservation easements on the back lots may be needed to move forward.

Notable features on site include: critical soils, such as hydric soils. This could also provide a good opportunity for a wetland creation site to help store and treat extra storm water.

Critical soils completely cover this site.

This property is zoned single family residential. Should housing development be targeted in this area, low impact development (LID) standards should be administered.

LID techniques should focus on distributed storm water management to limit soil compaction where possible. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T10
Total CCBT Acres	11.2
Number of Parcels	31
Critical Soils	11.2
Steep Slopes	0.0
Flood Zones	0.0
Streams	0.0
Headwater Stream	0.0
Forest	11.1
Wetlands	0.0
<b>Total</b>	<b>22.2</b>

# Undeveloped Area #04 (PCA)

Large tract #04 is the thirty-ninth-largest open space area in the watershed with 11 acres.

This area is located on the border of Broadview Heights and North Royalton, between both Lydia and Amelia Drives.

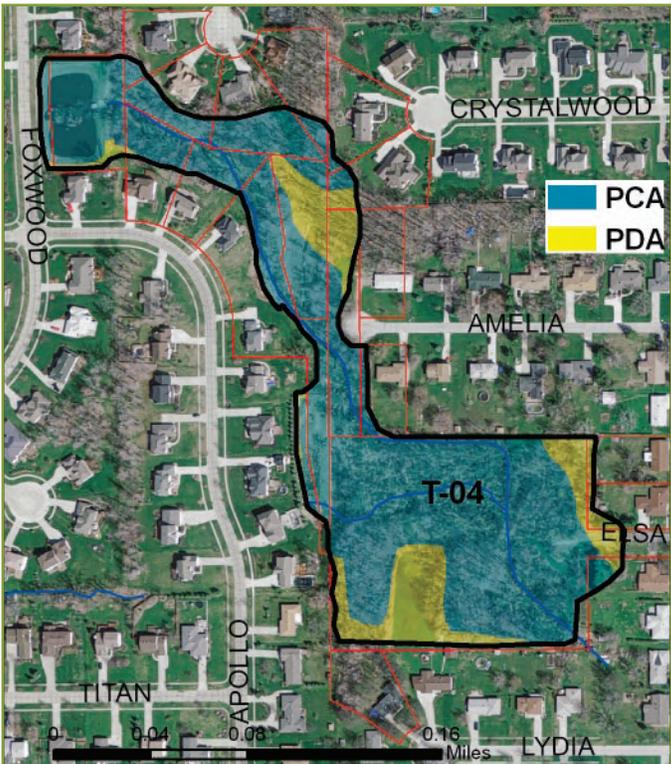
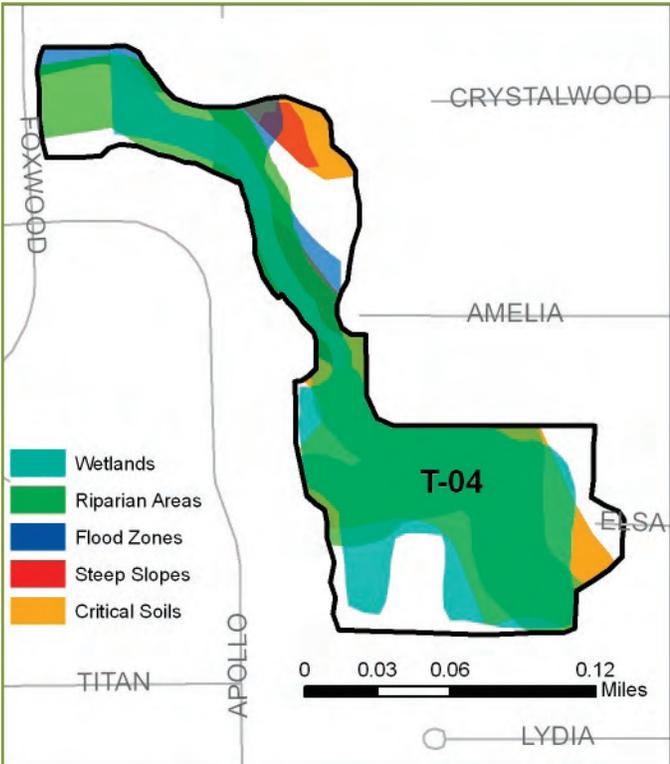
Notable features on site include: wetlands, forested areas, streams, flood zones, critical soils and a small portion of steep slopes.

This stream, flood zone and wetland complex provides important storm water retention capacity during storm events and should be considered for preservation and enhancement.

Of the 11 acres, 2 acres (18%) exist without any critical watershed feature (\*calculation does not include forest cover), leaving very little suitable area for development.

This area is zoned single family housing, but should be considered for preservation purposes and enhancements to improve stormwater capacity and habitat.

Large Tract	T04
Total CCBT Acres	11.1
Number of Parcels	18
Critical Soils	5.7
Steep Slopes	0.2
Flood Zones	1.8
Streams	0.3
Headwater Stream	0.0
Forest	5.7
Wetlands	6.1
<b>Total</b>	<b>19.8</b>



# Undeveloped Area #18

(PCA - Conservation Development)

Large tract #18 is the smallest of the identified open space areas in the watershed with 9 acres.

This area is located in the city of Broadview Heights, between the Metroparks' Valley Parkway and Interstate 80.

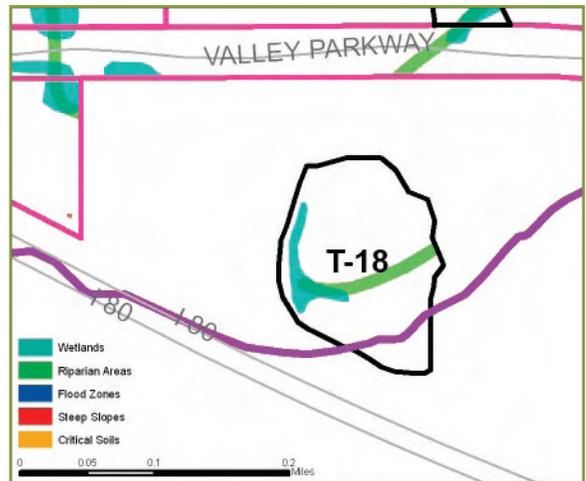
This property is uniquely located near Metropark land, which provides opportunity for park expansion and watershed enhancements.

Notable features on site include: wetlands, forested areas and a portion of a primary headwater stream.

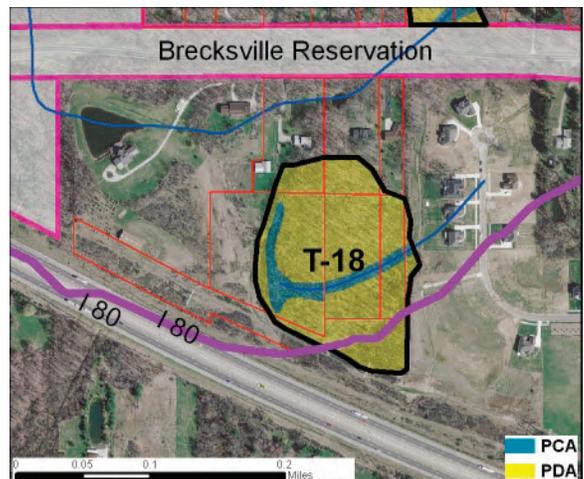
Of the 9 acres, 8 acres (87%) exist without any critical watershed information (\*calculation does not include forest cover).

This area is zoned single family residential. Should housing development be targeted in this area, conservation development standards should be administered.

Appropriate setback measures should be applied to the primary headwater and wetland complex. Canopy cover should be conserved by minimizing clearing and setting a desired overall canopy target for the jurisdiction and/or land use.



Large Tract	T18
Total CCBT Acres	9.4
Number of Parcels	7
Critical Soils	0.0
Steep Slopes	0.0
Flood Zones	0.0
Streams	0.0
Headwater Stream	0.7
Forest	7.4
Wetlands	0.7
<b>Total</b>	<b>8.8</b>



# Tools for Watershed Stewardship

## PRACTICES & STRATEGIES

Stormwater management begins with site planning and design. Development projects can be designed to reduce their impacts on watersheds when careful efforts are made to conserve natural areas, reduce impervious cover and better integrate stormwater treatment.

By implementing a combination of these nonstructural approaches it is possible to reduce the amount of runoff and pollutants that are generated from a site and provide for some nonstructural on-site treatment and control of runoff.

Better site design for stormwater management includes a number of site design techniques, such as preserving natural features and resources, effectively laying out the site elements to reduce impact, reducing the amount of impervious surfaces, and using natural features on the site for stormwater management. Many of the better site design concepts can reduce the cost of infrastructure while maintaining or even increasing the value of the property.

### BALANCED GROWTH LAND USE PRACTICES

- Adopt Watershed Map for Community Guidance
- Conserve Streams and Riparian Corridors
- Conserve Wetlands and Setbacks
- Avoid Floodplains
- Avoid Steep Slopes
- Minimize Development on Critical Soils
- Low Impact Development
- Conservation Development
- Woodland / Tree Canopy Protection

# Tools & Practices

## Identifying Conservation Areas & Incorporating Better Site Design

Site design should be done in concert with the design and layout of stormwater infrastructure in order to reach stormwater management goals.

First, significant natural features and resources on a site are identified, such as undisturbed forest areas, stream buffers and steep slopes that should be preserved to retain some of the original hydrologic function of the site.

Next, the site layout is designed such that these conservation areas are preserved and the impact of the development is minimized. A number of techniques can then be used to reduce the overall imperviousness of the development site.

Finally, natural features and conservation areas can be used to manage stormwater quantity and quality.



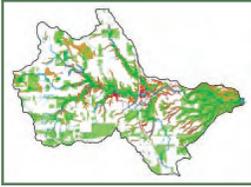
**Use Critical Watershed Feature Map as Guidance for Community Development and Conservation**

**Design Site Layout to Preserve Conservation Areas and Minimize Impervious Cover & Stormwater Impacts**

**Use Natural Features and Conservation Areas to Manage Stormwater Quantity and Quality**

THE GOALS OF BETTER SITE DESIGN include:

- Managing stormwater (quantity and quality) as close to the point of origin as possible
- Preventing stormwater impacts rather than mitigating them
- Using simple, nonstructural methods for stormwater management that are lower cost and lower maintenance than structural controls
- Using hydrology as a framework for site design



## ADOPT CRITICAL WATERSHED FEATURES MAP IN COMPREHENSIVE PLAN for Community Guidance

Important natural features such as primary headwater streams, wetlands and other important site features, when identified in the community's Comprehensive Plan, can assist with development and support conservation efforts.

### KEY BENEFITS

Provides an opportunity to update community zoning & plans

- Helps a community plan for, rather than react to proposed development
- Assists in managing floodplains, wetlands, riparian corridors that are currently providing flood control, erosion control and water quality protection.

A community's comprehensive plan helps to provide the framework for zoning that affects watershed quality. Priority Conservation and Development Areas should be included with the plan.

This should be done while examining local economics, plans for densities and land uses.

Preserving natural conservation areas such as undisturbed forested and vegetated areas, stream corridors and wetlands on a development site helps to preserve the original hydrology of the site and aids in reducing the generation of stormwater runoff and pollutants. Undisturbed vegetated areas also promote soil stabilization and provide for filtering, infiltration and evapotranspiration of runoff.

Conservation areas should be delineated before any site design, clearing or construction begins. When done before the concept plan phase, the planned conservation areas can be used to guide the layout of the site.

Conservation areas should be incorporated into site plans and clearly marked on all construction and grading plans to ensure that equipment is kept out of these areas and that native vegetation is kept in an undisturbed state. The boundaries of each conservation area should be mapped by carefully determining the limit which should not be crossed by construction activity.

Once established, natural conservation areas must be protected during construction and managed after occupancy by a responsible party able to maintain the areas in a natural state in perpetuity. Typically, conservation areas are protected by legally enforceable deed restrictions, conservation easements, and maintenance agreements.

### RECOMMENDATIONS:

- Review material and support data for Priority Development Areas (PDAs) and Priority Conservation Areas (PCAs).
- Incorporate the Priority Conservation Areas (PCA) and Priority Development Areas (PDA) into the Master Plan.
  - ~ Assess PDAs and PCAs locations as necessary for the nature of current development, ownership, and other relevant characteristics.
  - ~ Modify PDAs and PCAs for your community based on local data and development goals.
  - ~ Accept PDAs and PCAs for your community through resolution or ordinance.
  - ~ Revise comprehensive/master plan to include PDAs and PCAs. Review current zoning for PDAs and PCAs.
  - ~ Discuss possible zoning changes, land owner assistance, and other steps necessary to facilitate development in PDAs and conservation/innovative site design in PCAs.
- Routinely Update Community Master Plans-
  - the best local planning practice is "continuous planning"
  - compare plan to current conditions and update
  - plan for, rather than react to, proposed development.

CHIPPEWA CREEK PARTNER COMMUNITY	LAST UPDATE TO MASTER PLAN
Brecksville	1980
Broadview Heights	2002
North Royalton	2004
Parma	2004
Seven Hills	2002

# Tools & Practices

## Adopt Critical Watershed Features Map

KEY ROLES	KEY ACTIONS
Legislators	<ul style="list-style-type: none"> <li>• Update Community Master Plans, adopting Critical Features Map as overlay to guide land use decisions.</li> <li>• Incorporate Priority Conservation Areas (PCA) and Priority Development Areas (PDA) into community's Comprehensive Plan to guide zoning, and to identify natural areas as storm water management infrastructure assets</li> <li>• Develop or update building codes to include protections for critical areas</li> <li>• Use Map as reference to budget for protection, restoration and/or maintenance of natural infrastructure as is done for structural storm water infrastructure</li> </ul>
Planning Commissions	<ul style="list-style-type: none"> <li>• Develop and adopt Critical Features Map</li> <li>• Define specific allowable adjustments or variances based on the value and location of critical features, to guide appeals process</li> </ul>
Zoning Appeals Boards	<ul style="list-style-type: none"> <li>• Use Map as reference for decision making</li> <li>• Create guidelines, using Map to define allowable variances based on their potential impact on Conservation Areas, and to direct site design adjustments toward Preferred Development Areas.</li> </ul>
Administration, Economic Development, Community Development	<ul style="list-style-type: none"> <li>• Work with communities that share the watershed to approve the Critical Features Map, PCA and PDA designations</li> <li>• Adopt the Map and use it to guide development and conservation</li> <li>• Establish policy to direct new development to Preferred Development Areas and reduce impacts in conservation areas</li> <li>• Educate residents, business owners and developers on the significance of critical watershed features and their roles in stewardship</li> </ul>
Service and Engineering	<ul style="list-style-type: none"> <li>• Use the Map as a guide to take advantage of the natural storm water management infrastructure</li> <li>• Respect the Map designations and establish policies to manage infrastructure improvements or repairs in ways that do not negatively affect conservation areas</li> </ul>
Residents, Business Owners and Property Owners or Managers	<ul style="list-style-type: none"> <li>• Support adoption of the Map in your community</li> <li>• Learn about the areas that hold your watershed's critical features and need conservation</li> <li>• Understand how activities that degrade or change the size, location or character of wetlands, forested areas, streams and soils affects your property</li> </ul>
Developers	<ul style="list-style-type: none"> <li>• Familiarize yourself with the Map and the watershed</li> <li>• Design sites so as not to infringe on critical features or conservation areas</li> </ul>

## CONSERVE STREAMS & RIPARIAN CORRIDORS

Natural riparian corridors are vegetated lands along rivers and streams. They can stretch from a stream's headwaters down to its mouth.

### Key Benefits

- Reduces Flooding and Erosion Problems
- Keep Structures away from Flood Prone Areas
- Filters Storm Water Runoff
- Provides Connected Wildlife Habitat

A riparian buffer is a special type of natural conservation area along a stream, wetland or shoreline where development is restricted or prohibited. The primary function of buffers is to protect and physically separate a stream, lake or wetland from disturbance or encroachment.

A properly designed buffer can provide stormwater management functions, can act as a right-of-way during floods, and can sustain the integrity of stream ecosystems and habitats. Forested riparian buffers should be maintained and reforestation should be encouraged where no wooded buffer exists. Proper restoration should include all layers of the forest plant community, including understory, shrubs and groundcover, in addition to trees.

The setback width needed to perform properly will depend on the size of the stream and the surrounding conditions. The setback should be continuous and not interrupted by impervious areas that would allow stormwater to concentrate and flow into the stream without first flowing through the buffer. Should the 100-year floodplain be wider than the riparian setback on either or both sides of the watercourse, the setback is extended to the outer edge of the 100-year floodplain.

Development within the riparian buffer should be limited only to those structures and facilities that are absolutely necessary. Such limited development should be specifically identified in any codes or ordinances enabling the buffers. When construction activities do occur within the riparian corridor, specific mitigation measures should be required, such as deeper buffers or riparian buffer improvements.

### RECOMMENDATIONS:

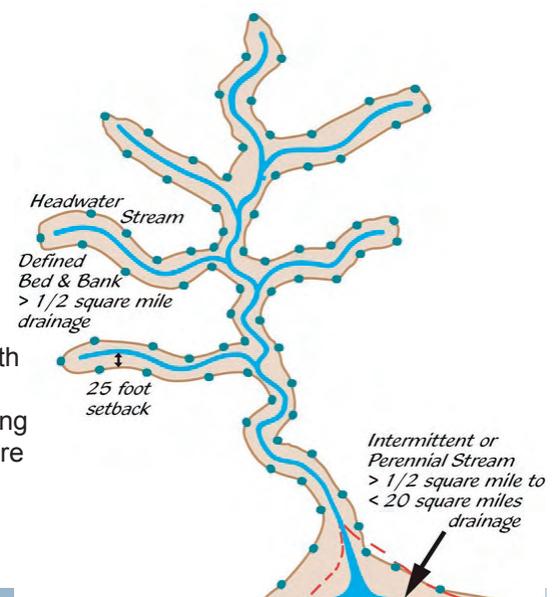
It is recommended that communities adopt zoning and other appropriate land-use and management provisions to address riparian protection. Protective areas along riparian corridors and around wetlands are best provided through local zoning setbacks.

Communities should adopt the Northeast Ohio Regional Stormwater Task Force Model riparian setback.

The riparian set back should :

- Apply to all designated watercourses in the community
- Conform to minimum widths (see recommended distances)
- Include 100 year floodplain and riparian wetlands
- Prohibit construction in riparian corridor
- Include variance and mitigation provisions to keep function within the same watershed.
- Provide for inspection and enforcement

As with all setbacks, riparian setbacks should be used in conjunction with conservation development design so that an economic hardship is not created for the landowner. The purpose is to preserve and protect existing riparian corridors from degradation and environmental damage, to restore the quality of degraded and damaged corridor, and to plan and control development around the feature with acceptable levels of quality and ecological character.



# Tools & Practices

## Conserve Streams & Riparian Corridors

### Recommended Riparian Distances

WATERSHED SIZE	SETBACK DISTANCE
<0.5 sq. miles	25 ft
0.5-20 sq. miles	75 ft.
20-300 sq. miles	120 ft.
>300 sq. miles	300 ft.



### Community Riparian Setbacks

COMMUNITY	Setbacks Meet Recommended Standards	Variance Procedures	Provisions to Keep Mitigation w/in Same Watershed
Brecksville	No	No	No
Broadview Heights	Yes.	Yes	No
North Royalton	Yes	Yes	No
Parma	Yes	Yes	No
Seven Hills	No	No	No

Brecksville currently has not adopted any riparian setback measure. Provisions exist (Section 1175) that no filling, land excavation can occur along drainage courses without certificate from city engineer proving that these alteration will not obstruct, reduce capacity etc.

Broadview Heights: Section 1483.12b – provides a min. 300 ft setback on both sides of all watercourses draining >300 sq. mi) a min. 120 ft setback on both sides of all watercourses draining > 20 sq. mi. & <=300 sq.mi; a min. 75 ft. setback on both sides of all watercourses draining >0.5 sq mi. & <=20 sq.mi. and a min. 50 ft setback on both sides of all watercourses draining <0.5 sq mi. & having a defined bed and bank.

North Royalton: Section 1492.06c – provides min. 300 ft setback on both sides of all streams draining >300 sq. mi; a min. 120 ft setback on both sides of all streams draining > 20 sq. mi. & < 300 sq.mi; a min. 75 ft. setback on both sides of all streams draining >0.5 sq mi. & < 20 sq.mi. and min. 25 ft on both sides of all streams draining <0.5 sq mi.

Parma: provides adopted riparian setbacks with a greater than or equal to 75ft. setback on Big Creek, West Creek, other water course draining >.5 sq mi. and < 20 sq mi.; and 25ft. setback on watercourses draining <.5 sq m, with defined bank.

Seven Hills: currently has not adopted any riparian setback measure.

# Tools & Practices

## Conserve Streams & Riparian Corridors

KEY ROLES	KEY ACTIONS
Legislators, Planning Commissions	<ul style="list-style-type: none"> <li>• Include Riparian Setbacks in zoning</li> <li>• Apply the setback to all designated watercourses in the community</li> <li>• Design setback codes to:               <ul style="list-style-type: none"> <li>• Conform to minimum widths and recommended distances</li> <li>• Include 100 year floodplain and riparian wetlands</li> <li>• Prohibit construction in riparian corridor</li> <li>• Include variance and mitigation provisions to keep function within the same watershed</li> <li>• Provide for inspection and enforcement</li> </ul> </li> <li>• Extend setbacks at least to the 100-year floodplain</li> </ul>
Zoning Appeals Boards	<ul style="list-style-type: none"> <li>• Respect riparian setback codes and be reluctant to allow incursions into riparian buffer areas</li> </ul>
Administration, Economic Development, Community Development	<ul style="list-style-type: none"> <li>• Create incentives for preservation and improvement of existing vegetated buffers, and restoration of areas where riparian plantings have been lost</li> </ul>
Service and Engineering	<ul style="list-style-type: none"> <li>• Limit incursions into riparian zones when doing structural infrastructure repairs or improvements by adding a “no dig zone” beyond the setback written in the code, and/or use proper protection at zone edges.</li> <li>• Reduce the burden on riparian zones adjacent to paved or turf areas, where excessive runoff is common, by using infiltration calculations that reflect the actual soil infiltration conditions in the area.</li> </ul>
Tree Commissions	<ul style="list-style-type: none"> <li>• Institute a forest mitigation program wherein developers or property owners who remove trees and/or forested areas can replant trees or replace forest cover in riparian zones</li> <li>• Use riparian zones as forest mitigation banks to receive trees and forest cover</li> <li>• Create a forest mitigation fund to receive payments in lieu of planting from developers or property owners who remove trees or forest cover, and:               <ul style="list-style-type: none"> <li>• use the funds to improve riparian areas on public lands,</li> <li>• work with private property owners to restore riparian areas if buffer zones on public land are not available,</li> </ul> </li> <li>• in cases where neither of the above solutions are applicable, use the funds to support the city’s urban forest/street tree planting program</li> </ul>
Residents, Business Owners and Property Owners or Managers	<ul style="list-style-type: none"> <li>• Plant or improve riparian zones using the full range of forest vegetation – tree canopy, understory trees and shrubs, floor vegetation and ground cover, giving preference to native species and totally avoiding invasive or exotic species.</li> <li>• Commercial property owners can take advantage of the increase in bird life resulting from healthy riparian areas by working with local birding clubs and producing birdwatchers’ guides.</li> </ul>
Developers	<ul style="list-style-type: none"> <li>• Familiarize yourself with the Map and the watershed</li> <li>• Design sites so as not to infringe on critical features or conservation areas</li> </ul>

# Tools & Practices

## #3

### CONSERVE WETLANDS & SETBACKS

Wetlands are areas that are inundated or saturated by surface or ground water at a duration sufficient to support vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

#### Key Benefits

- Reduces Flooding and Erosion Problems
- Keep Structures away from Flood Prone Areas
- Filters Storm Water Runoff
- Provides Wildlife Habitat

Wetlands are important and complex ecosystems in the Chippewa Creek Watershed. Wetlands function as natural sponges, to absorb excess stormwater and as natural kidneys, to filter pollutants from the water. Wetlands minimize flooding problems by retaining stormwater and allowing the water to either evaporate or slowly release into stream systems.

In Chippewa Creek many wetlands are located along the stream and therefore fall within the riparian corridor and proposed setback. A properly sized riparian setback will completely include the wetlands plus a 50-foot setback extending beyond the outer boundary of a category 3 wetlands and a 30-foot setback extending beyond the outer boundary of a category 2 wetlands. As for category 1 wetlands no setback has been suggested in the model ordinance. However, these wetlands have the potential for enhancements and can be improved to category 2 wetlands.

It is also important to protect wetlands that do not fall within the riparian corridor or termed isolated wetlands. Isolated wetlands should receive the same amount of attention and setback protection. Many communities in Ohio require isolated wetlands buffers and have adopted policies of no net loss of wetlands for mitigation required for destroyed wetlands.

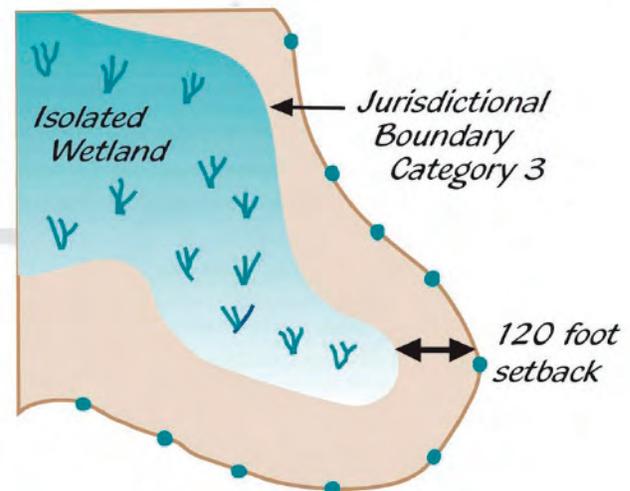
Category 3 wetlands have superior habitat, or superior hydrological or recreational functions.” They are typified by high levels of diversity, a high proportion of native species, and/or high functional values.

Category 2 wetlands support moderate wildlife habitat, or hydrological or recreational functions, and as wetlands which are dominated by native species but generally without the presence of, or habitat for, rare, threatened or endangered species; and have a potential for reestablishing lost wetland functions.”

Category 1 wetlands support minimal wildlife habitat, and minimal hydrological and recreational functions. They do not provide critical habitat for threatened or endangered species or contain rare, threatened or endangered species. In addition, Category 1 wetlands are often hydrologically isolated, and usually have: low species diversity, no significant habitat or wildlife use, limited wetland functions, and/or a predominance of non-native species.

Recommended Wetland Setbacks

WETLAND CLASS	SETBACK DISTANCE
1	Protect and enhance
2	75 ft.
3	120 ft.



## RECOMMENDATIONS:

It is recommended that communities adopt zoning and other appropriate land-use and management provisions to address wetland protection. Protective areas along riparian corridors and around wetlands are best provided through local zoning setbacks.

- Communities should adopt the Northeast Ohio Regional Stormwater Task Force Model Wetland Setback. The Northeast Ohio Regional Stormwater Model ordinance are available to protect and mitigate wetlands as part of a community's management program for flood control, erosion control, ground water recharge, and water quality protection.
- Include variance and mitigation provisions to keep function within the same watershed.
- As with all setbacks, wetlands setbacks should be used in conjunction with conservation development design so that an economic hardship is not created for the landowner. The purpose is to preserve and protect existing wetlands from degradation and environmental damage, to restore the quality of degraded and damaged wetlands, and to plan and control development around wetlands with acceptable levels of quality and ecological character.
- Conserve and enhance Category 1, 2 and 3 Wetlands. It is recommended that when wetlands are scarce in a drainage basin, the low quality wetlands still provide a valid public health and safety water quality and quantity function- and deserve protection. Category 1, 2 and 3 wetlands are defined by Ohio EPA using a qualitative assessment form.

### Community Wetland Setbacks

COMMUNITY	Setbacks Meet Recommended Standards for Category 2,3	Provisions to Protect and Enhance Category 1	Variance Procedures	Mitigation & Provisions to Keep Mitigation w/in Same Watershed
Brecksville	No	No	No	No
Broadview Heights	Yes.	No	Yes	No
North Royalton	Yes	No	Yes	No
Parma	Yes	No	Yes	Yes, but no mention of keeping mitigation in watershed
Seven Hills	No	No	No	No

Brecksville currently does not have wetland setback measures in their codified ordinances.

Broadview Heights has adopted wetland setbacks using the Northeast Ohio Regional Stormwater Model. The setbacks include 120 ft (category 3) and 75 ft (category 2) but does not provide a minimum setback or protection measures for category 1 wetlands. Variance procedures and permitted and restricted uses in setback were clearly spelled out in the ordinances. Mitigation was not addressed in their ordinance. Mitigation was just recently added to the NE Ohio Regional Model- this may be why other communities have not adopted yet.

North Royalton has adopted wetland setbacks using the Northeast Ohio Regional Stormwater Model. The setbacks include 120 ft (category 3) and 75 ft (category 2) but does not provide a minimum setback or protection measures for category 1

wetlands. Variance procedures and permitted and restricted uses in setback were clearly spelled out in the ordinances. Mitigation was not addressed in their ordinance. Mitigation was just recently added to the NE Ohio Regional Model- this may be why other communities have not adopted yet.

Parma has adopted wetland setbacks using the Northeast Ohio Regional Stormwater Model. The setbacks include 120 ft (category 3) and 75 ft (category 2) but does not provide a minimum setback or protection measures for category 1 wetlands. Variance procedures and permitted and restricted uses in setback were clearly spelled out in the ordinances. Parma has a wetland review board. The city also has mitigation provisions in the ordinances, but there was not mention of keeping the mitigation local (within same watershed) to offset the loss of functions.

Seven Hills currently does not have wetland setback measures in their codified ordinances.

# Tools & Practices

## Conserve Wetlands

KEY ROLES	KEY ACTIONS
Legislators, Planning Commissions	<ul style="list-style-type: none"> <li>• Include Wetland Setbacks in zoning</li> <li>• Apply the setback to all category 2 and 3 wetlands, and on a selective basis to category 1 wetlands (if only as flood control resources)</li> <li>• Design setback codes to:               <ul style="list-style-type: none"> <li>• Conform to minimum widths and recommended distances:</li> <li>• Category 3 – 120 ft.</li> <li>• Category 2 – 75 ft.</li> <li>• Include 100 year floodplains</li> <li>• Include variance and mitigation provisions to keep function within the same watershed</li> <li>• Provide for inspection and enforcement</li> </ul> </li> <li>• Integrate in Conservation Development zoning</li> </ul>
Zoning Appeals Boards	<ul style="list-style-type: none"> <li>• Enforce wetland protection codes</li> </ul>
Administration, Economic Development, Community Development	<ul style="list-style-type: none"> <li>• Create incentives for preservation and improvement of existing wetlands, and restoration of category 1 wetlands to provide in-watershed mitigation sites</li> </ul>
Service, Engineering, Building Inspectors	<ul style="list-style-type: none"> <li>• Observe Clean Water Act regulations and enforce US Army Corp of Engineers permits</li> <li>• Monitor construction sites closely for deviation from approved plans</li> <li>• Require construction vehicles to stay proper distances away from wetlands</li> </ul>
Residents, Business Owners and Property Owners or Managers	<ul style="list-style-type: none"> <li>• See wetlands as enhancements and scenic, educational or recreational resources</li> <li>• Maintain a dense buffer of native vegetation between any paved surfaces and the wetland</li> <li>• Do not plant invasive species where seeds can be blown or washed into wetlands</li> </ul>
Developers	<ul style="list-style-type: none"> <li>• Recognize the value of wetlands and preserve whenever possible</li> <li>• Mitigate lost wetlands on site when possible</li> <li>• Building “up” rather than “out” can help you use a site footprint limited by setback requirements</li> <li>• Respect permit requirements and keep construction vehicles far away</li> </ul>
Stewardship Groups	<ul style="list-style-type: none"> <li>• Use wetlands as educational resources</li> <li>• Create a guide to the birds and animals that live in or visit the wetland</li> <li>• Raise funds and work with landowners, city governments, state agencies, land conservancies and others to conserve strategic wetlands and setback areas.</li> </ul>

# Tools & Practices #4 CONSERVE FLOOD PLAINS

Floodplains are the low-lying flat lands that border streams and rivers. When a stream reaches its capacity and overflows its channel after storm events, the floodplain provides for storage and conveyance of these excess flows.

## Key Benefits

- Preserving floodplains provides a natural right-of-way and temporary storage for large flood events
- Keeps people and structures out of harm's way
- Helps to preserve riparian ecosystems and habitats
- Can be combined with riparian buffer protection to create linear greenways

Floodplain areas should be avoided for homes and other structures to minimize risk to human life and property damage, and to allow the natural stream corridor to accommodate flood flows. In their natural state they reduce flood velocities and peak flow rates by the passage of flows through dense vegetation.

Floodplains also play an important role in reducing sedimentation and filtering runoff, and provide habitat for both aquatic and terrestrial life. Development in floodplain areas can reduce the ability of the floodplain to convey stormwater, potentially causing safety problems or significant damage to the site in question, as well as to both upstream and downstream properties. Most communities regulate the use of floodplain areas to minimize the risk to human life as well as to avoid flood damage to structures and property.

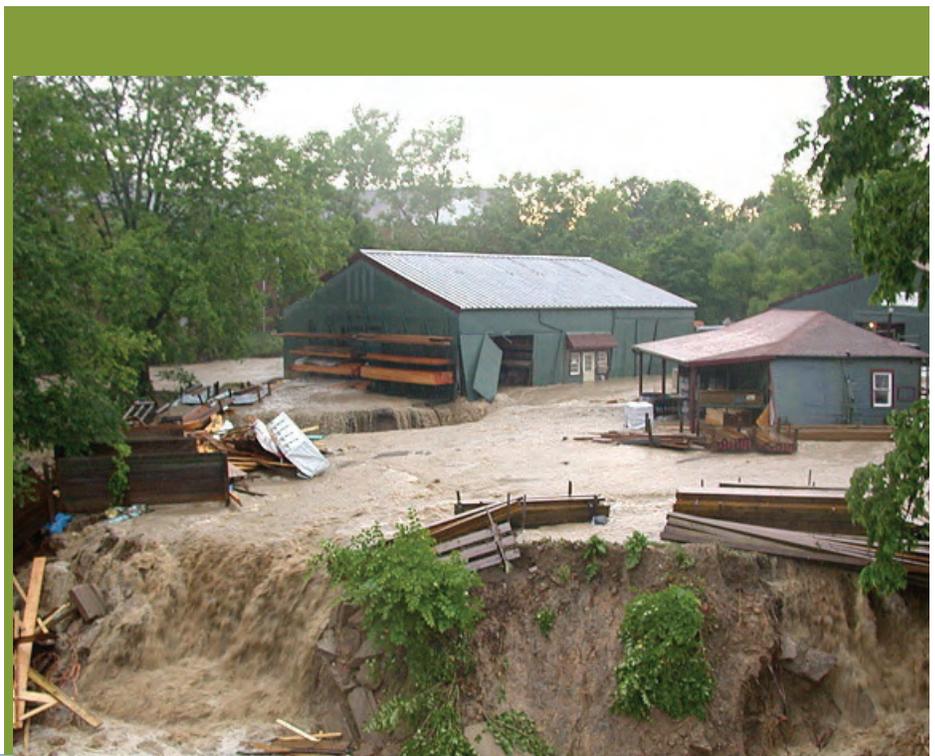
Floodplain protection is complementary to riparian corridor preservation. Both of these better site design practices preserve stream corridors in a natural state and allow for the protection of vegetation and habitat. Depending on the site topography, 100-year floodplain boundaries may lie inside the riparian setback, in other cases the riparian corridor should be extend outward to meet the flood zone boundary.

## RECOMMENDATIONS:

Floodplain areas should be avoided on a development site in the Chippewa Creek Watershed. Ideally, the entire 100-year floodplain should be avoided for clearing or building activities, and should be preserved in a natural undisturbed state where possible.

Review Ohio Department of Natural Resources latest floodplain regulations and map modernization program

- Incorporate most up-to-date maps into zoning
- Riparian setback should extend out to FEMA 100 year floodplain.
- Review ODNR Floodplain Regs. for adoption.
- Focus development in areas where they will have the least impact - out of the floodway.



# Tools & Practices

## Conserve Flood Plains

### Community 100-year Floodplain Setbacks

COMMUNITY	RIPARIAN SETBACK INCLUDES 100yr FLOODPLAIN
Brecksville	No, but provision to recognize floodplain
Broadview Heights	Yes
North Royalton	Yes
Parma	Yes
Seven Hills	No

Brecksville currently does not have a riparian setback that would include the designated 100 year floodplain. Brecksville includes a provisions (Section 1175) that no filling, land excavation can occur along drainage courses (or w/in 100ft or more) without certificate from city engineer proving that these alteration will not obstruct, reduce capacity etc.

Broadview Heights provision read, “Where the 100-year floodplain is wider than a riparian setback on either or both sides of a designated watercourse, the riparian setback shall be extended to the outer edge of the 100-year floodplain. The 100-year floodplain shall be determined by the project engineer conducting a hydrologic analysis of the project area in conformance with standard engineering practices and approved by the City Engineer”.

North Royalton provision, “Where the 100-year floodplain is wider than a riparian setback on either or both sides of a designated watercourse, the riparian setback shall be extended to the outer edge of the 100-year floodplain. The 100-year floodplain shall be determined by the project engineer conducting a hydrologic analysis of the project area in conformance with standard engineering practices and approved by the City Engineer”.

Parma- Chapter. 1111.05(d)(3) “Where the 100-year floodplain is wider than a riparian setback on either or both sides of a watercourse, the riparian setback shall be extended to the outer edge of the 100-year floodplain”.

Seven Hills currently does not have a riparian setback that would include the designated 100 year floodplain.

KEY ROLES	KEY ACTIONS
Legislators, Planning Commissions	<ul style="list-style-type: none"> <li>• Incorporate the most up-to-date flood plain maps into zoning and building codes</li> <li>• Recognize that increased impervious surfaces in one area will have the effect of enlarging flood plains of downstream areas</li> <li>• Provide incentives or relief to landowners in areas where floodplains create un-buildable areas</li> <li>• Allow increased density on development sites in lowest-impact areas</li> <li>• Change codes to allow higher “weed” growth in flood plains</li> </ul>
Zoning Appeals Boards	<ul style="list-style-type: none"> <li>• Respect floodplain boundaries</li> <li>• Recognize that variances allowing structures to encroach on floodplains will inevitably create problems</li> </ul>
Administration, Economic Development, Community Development	<ul style="list-style-type: none"> <li>• Support floodplain preservation with policies that support generous setbacks and encourage landowners to vegetate and maintain riparian corridors and floodplains</li> <li>• Focus development in areas where they will have the least impact</li> <li>• Encourage developers to design sites with structures away from flood plains, and with pervious surfaces and dense, natural landscaping close to flood plain boundaries</li> </ul>
Service and Engineering	<ul style="list-style-type: none"> <li>• Use structural flood management systems only as complements to natural systems.</li> <li>• Reduce channelization and culverts upstream so that floodplains downstream can handle increased loads</li> <li>• Keep riparian areas and flood plains vegetated by reducing mowing</li> </ul>
Residents, Business Owners and Property Owners or Managers	<ul style="list-style-type: none"> <li>• Be aware that solutions to “rush and flush” water off your land will invariably create flooding problems downstream</li> <li>• Accept the fact that streams will flood on occasion, and keep any structural solutions such as berms or dikes as far from the stream and as close to your buildings as possible</li> <li>• Use permeable paving surfaces in areas near flood zones to increase the speed at which the water infiltrates into soils</li> <li>• Let vegetation grow higher along flood plains</li> </ul>
Developers	<ul style="list-style-type: none"> <li>• Design sites so as to leave plenty of room beside flood plains</li> <li>• Keep areas along flood plain boundaries heavily vegetated</li> <li>• Use permeable paving throughout the site, and include vegetated areas to hold excess water (rain gardens, etc.)</li> </ul>

# Tools & Practices

## #5

### AVOID STEEP SLOPES

Steep slopes should be avoided due to the potential for soil erosion and increased sediment loading; especially those with a grade of 15% or greater. Excessive grading and flattening of hills and ridges should be minimized.

#### Key Benefits

- Prevents soil erosion and stormwater runoff
- Prevents property damage
- Building on flatter areas reduces the need for cut-and-fill and grading
- Keeping steep slopes vegetated helps to stabilize hillsides
- Maintains aesthetics

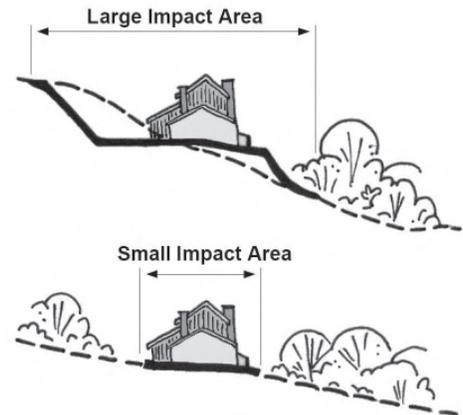
Vegetated steep slopes provide an important resource to be preserved because any significant disturbance to the hillside's environment may result in:

- Landslides or land instability;
- Unacceptable alteration in the drainage patterns and
- Loss of scenic value.

When development takes place on or near steep slopes, vegetative cover is greatly reduced. Loss of this vegetative cover on steep terrain significantly increases soil instability, and thus the risk of erosion.

Soil erosion and sedimentation into waterways poses several threats to public health and safety, which are difficult and expensive to correct. Property damage is commonly associated with development on steep slopes. Soil erosion and sedimentation into nearby waters increase the potential for flooding. In addition, the nature of steep slopes means that greater areas of soil and land area are disturbed to locate facilities on them compared to flatter slopes

The need to protect these slopes is based on percent slope, the length of that percent slope, soil erodibility, percent of vegetation, and proximity to streams or wetlands. The maximum retention of natural topographical features such as natural drainage swales, slope ridge lines, and trees and other natural plant formations should be encouraged. Steep slope protection will conserve and promote public health and safety by minimizing problems due to water runoff and soil erosion incurred in adjustments of topography to meet developmental needs. In addition to public health and safety concerns, protecting steep slopes preserves the unique scenic resources and habitats.



Community Steep Slope Setbacks

COMMUNITY	Permit-Based	Setback% Slope	Setback Based on Analysis
Brecksville	No	No	No
Broadview Heights	Yes.	No	Yes
North Royalton	Yes	No	Yes
Parma	Yes	No	Yes
Seven Hills	No	No	No

### RECOMMENDATIONS:

The development of areas containing steep slopes should generally be discouraged. In situations where this is not feasible, development should be done with the intent of minimizing soil disturbances, maximizing retention of trees and vegetation, and complementing steep slope character. Existing patterns of vegetation should be retained on all slopes over 15% to avoid erosion or slippage.

Three options can assist in establishing setback widths that provide the same watercourse protection as flatter areas.

#### Option 1: Permit Based Hillside Protection Zones

Regulations are passed that limit development activity in areas with slopes between 15% and 30%. In order for permits to be given for disturbances in these areas, additional information including topographic maps, grading and site plans, geotechnical reports, details on future and present site stability, and an erosion and sediment control plan must be submitted for review. Option 1 focuses mainly on structural integrity and not the functioning of the riparian area and watercourse. The recommendations given under this option may also not be appropriate for all areas of the watershed.

Example- Summit County Ordinance- steep slope development a conditional use

#### Option 2: Expansion of Riparian Setback for % Slope

For many communities in the nation, minimum widths are usually established for riparian setbacks. In areas in which steep slopes exist within the designated riparian setbacks, these widths are expanded.

The expansions to the original widths are as follows:

- Add 10 feet for slopes between 15-17%
- Add 30 feet for slopes between 18-20%
- Add 50 feet for slopes between 21-23%
- Add 60 feet for slopes between 24-25%

Option 2 (Preferred) focuses on the degree of sloping and may not cover other important factors that play a role in riparian effectiveness into consideration

Example- North Royalton's riparian setback adjustment based on % slope.

#### Option 3: Expansion of Riparian Setbacks Based on Analysis of Slope, Slope Length, Soil Erodibility and Existing Vegetation

Riparian setbacks are adjusted where steep slopes, 10% or greater, exist within 500 feet of a watercourse. In these areas, a plan is required that details information regarding the degree of sloping, the slope length, soil erodibility, vegetative cover, and sediment delivery. Option 3 (Preferred) provides the best alternative, as it based on site-specific conditions and recommendations.

Brecksville- Section 1179.09a, The areas allowed for building development shall lie outside of the flood plain, possess stable soil structure and consist of area with slopes of less than 15% gradient and which, through approved limited regrading, are physically suited for building development.

Broadview Heights- currently no steep slope ordinance has been adopted

North Royalton included in the riparian setback provisions to protect steep slopes. Because the gradient of the riparian corridor significantly influences impacts on the stream, the following adjustment for steep slopes will be integrated into the riparian setback formula for width determination: Average Percent Slope (APS) = 15-20%, add 25 feet to the setback width; if APS = 20-25%, add 50 feet to the setback width; if APS >25%, add 100 feet to the setback width.

Parma- currently no steep slope ordinance has been adopted

Seven Hills- currently no steep slope ordinance has been adopted

Percent Slope is the ratio of the vertical distance to the horizontal distance, or the elevation change in feet divided by the distance in feet.

# Tools & Practices

## Avoid Steep Slopes

KEY ROLES	KEY ACTIONS
Legislators, Planning Commissions	<ul style="list-style-type: none"> <li>• Expand riparian setbacks based on site-specific conditions, especially where slopes are greater than 10% and are within 500 feet of a watercourse.</li> <li>• Conserve steep slopes, especially those close to riparian corridors, with special permitting that limits development and disturbances in areas with slopes greater than 15%.</li> </ul>
Zoning Appeals Boards	<ul style="list-style-type: none"> <li>• Do not allow variances that encroach on setbacks from steep slopes</li> <li>• Do not allow replacement of vegetation around steep slopes with impervious surfaces, including turf grass.</li> </ul>
Administration, Economic Development, Community Development	<ul style="list-style-type: none"> <li>• Discourage development on or adjacent to steep slopes</li> <li>• Work with private landowners to establish conservation areas where steep slopes exist.</li> <li>• Invest in restoration where development may already be negatively impacting soils and degrading slopes.</li> </ul>
Developers	<ul style="list-style-type: none"> <li>• Design sites to avoid building near steep slopes. Structural solutions may be short term remedies, but soils erode. Period.</li> <li>• Avoid disturbing steep slopes during construction. Construction equipment will change soil character and compaction.</li> <li>• Replace any disturbed soils with native vegetation, preferably those with large and/or dense root systems</li> </ul>
Stewardship Groups	<ul style="list-style-type: none"> <li>• Support preservation and enhancement of these areas, which are usually wooded</li> <li>• Educate landowners about the importance of conservation</li> </ul>

## MINIMIZE DISTURBANCES TO CRITICAL SOILS

Critical soils such as, well drained, moderate infiltration and hydric soils provide an opportunity for groundwater recharge of stormwater runoff management and should be maintained as an additional source of stormwater management. These critical soils are “working” for the communities and disturbance and compaction to them should be limited.

### Key Benefits

- Allows stormwater to infiltrate into the ground
- Water that penetrates the soil gets filtered
- Slowly releases stormwater into the stream system

Infiltration of stormwater into the soil reduces both the volume and peak discharge of runoff from a given rainfall event, and also provides for water quality treatment.

Soils with maximum permeabilities (Well Drained and Moderate Infiltration) allow for the most infiltration of runoff into the ground.

Therefore, areas of a site with these soils should be conserved as much as possible and these areas should ideally be incorporated into undisturbed natural or open space areas. Conversely, buildings and other impervious surfaces should be located on those portions of the site with the least permeable soils.

### RECOMMENDATIONS:

Communities should protect critical soils by:

- Unpaved areas of pervious soils should be left undisturbed.
  - Retaining natural drainage patterns where possible
  - Retaining or integrating rough, native species vegetation
  - Integrating large-scale restored natural landscapes
  - Increasing the distances for stormwater runoff to travel
  - Diverting runoff to grassy swales which feed into a meadow or woodlands
- \* Adopt low impact and conservation development design standards that include the protections measures discussed above.



# Tools & Practices

## Minimize Disturbances to Critical Soils

Brecksville has a provision to minimize disturbance to natural features on building sites.

Broadview Heights has a provision that minimizes the disturbance to natural drainage characteristics of the building site; and preserve, to the maximum extent practicable, natural infiltration and groundwater recharge, and maintain subsurface flow that replenishes water resources, wetlands, and wells.

North Royalton has a provision that minimizes the disturbance to natural drainage characteristics of the building site; and preserve, to the maximum extent practicable, natural infiltration and groundwater recharge, and maintain subsurface flow that replenishes water resources, wetlands, and wells.

Parma has a provision that minimizes the disturbance to natural drainage characteristics of the building site; and preserve, to the maximum extent practicable, natural infiltration and groundwater recharge, and maintain subsurface flow that replenishes water resources, wetlands, and wells.

### Community Provisions to Minimize Disturbance

COMMUNITY	Provisions to Minimize Disturbance	Soil Provision Included in Low Impact / Conservation Design
Brecksville	Yes	No
Broadview Heights	Yes.	No
North Royalton	Yes	No
Parma	Yes	No
Seven Hills	No	No

Seven Hills has a top soil removal regulation (Ch. 1135). No ordinance was indentified which would sufficiently protect identified critical soils.

### MINIMIZE DISTURBANCE TO CRITICAL SOILS

KEY ROLES	KEY ACTIONS
Legislators, Planning Commissions	<ul style="list-style-type: none"> <li>• Require that critical draining soils be protected from compaction or removal during construction.</li> <li>• Encourage landowners to keep grassy swales maintained with native vegetation (change mowing laws to allow taller grasses/native vegetation.)</li> </ul>
Administration, Economic Development, Community Development	<ul style="list-style-type: none"> <li>• Account for the value of drainage services that permeable soils provide in storm water management. It is the inverse of the damage that impervious surfaces cause.</li> <li>• Discourage development on high quality permeable soils. Instead, encourage development on soils that are not as valuable.</li> <li>• Work with private landowners to establish conservation areas where valuable draining soils exist.</li> </ul>
Engineering	<ul style="list-style-type: none"> <li>• Place compaction limitations on disturbed areas of critical soils</li> <li>• Retain natural drainage patterns whenever possible</li> <li>• Use infiltration tables that are appropriate for the actual condition that the soil on a construction site will be in after compaction.</li> </ul>
Developers	<ul style="list-style-type: none"> <li>• Design sites to avoid building on well-drained soils.</li> <li>• Avoid compaction during construction.</li> <li>• Replace topsoil after construction to the level before construction, and plant with native species, not turf grass.</li> </ul>

## USE LOW IMPACT DEVELOPMENT (LID)

Low-impact development (LID) is a site design approach, which seeks to integrate hydrologically functional design with pollution prevention measures to compensate for land development impacts on hydrology and water quality.

### Key Benefits

- Reduces Impervious cover
- Manages stormwater onsite
- Minimizes downstream flooding
- Maintains predevelopment runoff concentrations through innovative best management practices.

LID's goal is to mimic natural hydrology and processes by using small-scale, decentralized practices that infiltrate, evaporate, detain, and transpire stormwater. LID stormwater controls are uniformly and strategically located throughout the site.

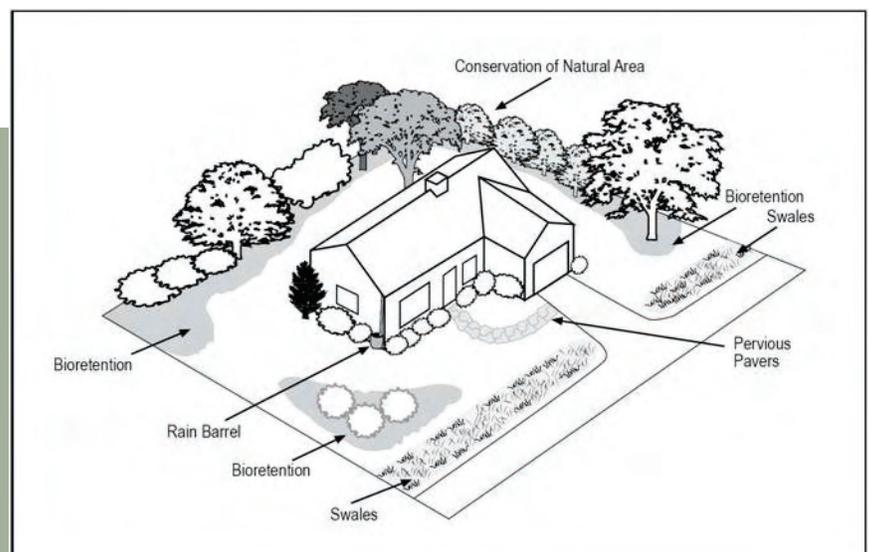
LID is achieved by:

- Minimizing stormwater runoff impacts to the extent practicable through preservation of existing landscape features and their hydrologic functions.
- Maintaining predevelopment time of concentration through strategic routing of flows using a variety of site design techniques.
- Dispersing runoff storage measures through a site's landscape through the use of a variety of detention, retention, and runoff practices.

LID practices manage stormwater at its source. LID measures reduce impervious cover, minimize disturbance, preserve and recreate natural landscape features, increase hydrologic disconnects and facilitate infiltration and detention opportunities. LID creates a multifunctional landscape which relies on natural features and processes and emphasizes simple, nonstructural, low-tech methods.

Due to maintenance considerations, LID may be most appropriately used on institutional, industrial, commercial and governmental developments. However, LID in tandem with conventional stormwater control features can be successfully integrated into any development. LID has been demonstrated to work in new developments and constrained sites involving urban infill.

LIDs can be effective tools to retrofit existing properties.



# Tools & Practices

## Use Low Impact Development (LID)

### RECOMMENDATIONS:

Allow for the Implementation of Low Impact Development Techniques.

- **Adopt Low Impact Development Provisions:** Adopt zoning and other appropriate land-use and management provisions to allow for the use of low impact development techniques for residential, business and industrial districts. This may be done through a comprehensive regulation related to site development or a set of related regulations.
- **Parking Lot Standards:** Include setting maximums of parking lots created (using average demand rather than peak demand), minimizing the dimensions of lot spaces, using alternative pavers in overflow parking areas, using bioretention areas to treat stormwater.
- **Impervious Surface Limits:** Place a percentage limit on impervious surface coverage. Examples include 10-20% in residential areas and 30% and up in commercial/high density residential.
- **Compacted Soils:** Unpaved areas of pervious soils should be left undisturbed. Retaining natural drainage features and encouraging conservation site design to protect against excessive soil compaction.
- **Allow for Integrated Stormwater Management Practices:** The LID principles are designed to minimize disturbance and manage storm water as close to its source as possible. Specific low impact development controls, called Integrated Management Practices (IMP's), are tools for developers to use to manage storm water at its source rather than relying solely on centralized Best Management Practices (BMP's), such as detention basins. These IMPs include a variety of non-structural and structural practices such as:

- o Riparian and wetland setbacks
- o Biofiltration facilities
- o Vegetated swales
- o Cistern & rain barrels
- o Infiltration trenches
- o Green roofs

- Examples:
1. City of Kent's Low Impact Development Ordinance- Chapter 1203
  2. City of Cuyahoga Falls' Green Overlay District- Chapter 1132

### Low Impact Development

COMMUNITY	Low Impact Development Ordinance	Impervious Surface Limits	Provisions for Pervious Pavers	Provisions to Integrate Stormwater BMPs
Brecksville	No	No	No	No
Broadview Heights	No.	No	Yes	No
North Royalton	No	No	Yes	No
Parma	No	No	No	No
Seven Hills	No	No	No	No

Brecksville currently does not have a Low Impact Development ordinance.

Broadview Heights currently does not have a Low Impact Development ordinance. They do have a provision that promotes porous pavement should development occur within setback areas. It states, "Variances should not be granted for asphalt or concrete paving in the riparian and wetland setbacks in any situation where gravel or porous pavement (i.e., porous pavers, and similar products) will do the job".

North Royalton currently does not have a Low Impact Development ordinance. They do have a provision that promotes porous pavement should development occur within setback areas. It states, "Variances should not be granted for asphalt or concrete paving in the riparian and wetland setbacks in any situation where gravel or porous pavement (i.e., porous pavers, and similar products) will do the job".

Parma currently does not have a Low Impact Development ordinance.

Seven Hills currently does not have a Low Impact Development ordinance.

\* Porous pavement- Porous pavement is a permeable pavement surface with a stone reservoir underneath. The reservoir temporarily stores surface runoff before infiltrating it into the subsoil or discharging into a sewer system.

# Tools & Practices Use Low Impact Development (LID)

KEY ROLES	KEY ACTIONS
Legislators, Planning Commissions	<ul style="list-style-type: none"> <li>• Allow for implementation of LID techniques in building codes</li> <li>• Adopt LID provisions in zoning of residential, commercial and industrial districts</li> <li>• Set maximum parking lot size rather than minimum. Size for average demand rather than peak demand</li> <li>• Limit area of impervious surface allowed, including roofs and impervious paving, as percentage of total area.</li> </ul>
Zoning Appeals Boards	<ul style="list-style-type: none"> <li>• Allow variances for LID techniques</li> </ul>
Administration, Economic Development, Community Development	<ul style="list-style-type: none"> <li>• Encourage residents and businesses to retrofit properties with LID elements, and support code changes if necessary</li> <li>• Incentivize installation of LID practices on existing properties; recognize the stormwater management value and contribution to reduction of cost and burden on municipal systems</li> <li>• Reward developers who use LID practices and reduce your stormwater infrastructure costs</li> </ul>
Service and Engineering	<ul style="list-style-type: none"> <li>• Adopt LID for community-owned properties and offer as demonstration sites</li> </ul>
Stewardship Groups	<ul style="list-style-type: none"> <li>• Train residents and landscapers to build raingardens, and sponsor demonstrations</li> <li>• Encourage installation of rainbarrels, ponds and other backyard-friendly water storage and management practices</li> </ul>
Residents, Business Owners and Property Owners or Managers	<ul style="list-style-type: none"> <li>• Use the areas on your property the way they want to work – an area that holds water wants to be a raingarden or pond, so surround it with decorative rocks and native plants or build a raingarden there, and direct roof runoff to your yard, not to the storm sewer.</li> <li>• Install pervious pavers in place of concrete or asphalt.</li> <li>• Replace turf grass with more pervious ground cover.</li> <li>• Plant trees.</li> </ul>
Developers	<ul style="list-style-type: none"> <li>• Use Integrated Stormwater Management Practices that minimize disturbance and manage stormwater at its source, rather than relying on BMPs such as detention basins. IMPs include structural and non-structural methods such as:               <ul style="list-style-type: none"> <li>• Riparian and wetland setbacks</li> <li>• Biofiltration facilities to hold and filter discharge</li> <li>• Vegetated swales to absorb and drain water</li> <li>• Green roofs to reduce runoff</li> <li>• Cisterns &amp; rainbarrels for water harvesting and temporary storage</li> <li>• Infiltration trenches</li> </ul> </li> <li>• Use Pervious/Permeable paving materials for significant portions, if not all, of paved walkways and parking surfaces</li> <li>• Replant trees and forest cover lost during construction</li> </ul>

# Tools & Practices

## #8

### CONSERVATION DEVELOPMENT

Conservation Development refers to development practices that allow land to be developed while conserving a sense of rural character, protecting natural resource features, and insuring water quality. In the process, property rights are protected, the community retains its unique identity and resources, the developer benefits with a high-quality project, and the environmental impacts of development are reduced.

#### Key Benefits

- Reduces impervious surface area
- Reduces development and community infrastructure costs
- Protects and integrates openspace areas into neighborhoods
- Open space can be used to protect natural resources onsite
- Reduces stormwater runoff
- Allows communities to retain rural character

Conservation Development typically allows higher density on a portion of the site in order to leave the rest of the site undeveloped. This results in the same number of structures that would be allowed in a traditional development on a particular parcel of land being located with more flexibility. This flexibility in housing lot sizes and setbacks makes it much more palatable to developers. As part of the site design, at least 40% of the land should be set aside as permanent open space. The resulting protected open space provides room for conservation practices that serve to buffer the impacts of the development.



Traditional Dispersed Development



Conservation Development

Conservation Developments should not be confused with Low Impact Development.

- Conservation Development involves the overall layout of the property to retain open space. It may or may not include Low Impact Development measures in its site plan.
- Low Impact Development practices apply to on-site measures used for stormwater retention and management.

## Conservation Development (single family)

COMMUNITY	Flexible Development Options	Permitted-By-Right	40% Open Space Required	Density Bonuses	Open Space Used for Resource Protection
Brecksville	Yes	No	No - 20%	No	No
Broadview Heights	Yes.	No	Yes - 40%	No	No
North Royalton	Yes	Yes	Yes - 50%	No	No
Parma	Yes	No	No - 25%	No	No
Seven Hills	Yes	No	No - 25%	No	No

Brecksville has several different types of flexible planned development districts, such as PDA (Planned Development Area), PDOD (Planned Development Overlay District), MUPD (Mixed Use Planned Development), RPD (Residential Planned Development).

Broadview Heights has a Rural Residential District which accommodate creative and imaginative planned community design. This district can be used for the conservation of the natural amenities of the landscape etc.

North Royalton has a Single Family Cluster development option which is to help conserve the natural amenities of the landscape, which is in accordance with the goals set forth in their Master Plan

Parma has a Single Family Cluster District which encourages the conservation of any natural amenities on a site, including, but not limited to, steep slopes, wooded areas, floodplains and wetlands.

Seven Hills has Cluster Development District which provides flexible development and requires 25% open space.

### CONSERVATION DEVELOPMENT

KEY ROLES	KEY ACTIONS
Legislators, Planning Commissions	<ul style="list-style-type: none"> <li>• Make Conservation Development the default site design option</li> <li>• Require minimum 40% naturalized open space</li> <li>• Reduce open space credit for heavily-fertilized, barely pervious turf grass cover, and increase for forest area or use as mitigation bank.</li> </ul>
Zoning Appeals Boards	<ul style="list-style-type: none"> <li>• Do not allow variances post-construction or post-occupancy that would reduce conservation area percentage.</li> <li>• Require that variances you must approve be mitigated on site in comparable size or watershed function.</li> </ul>
Administration, Economic Development, Community Development	<ul style="list-style-type: none"> <li>• Offer incentives for Conservation Development</li> <li>• Use density bonus as incentives to cluster impervious surfaces</li> </ul>
Developers	<ul style="list-style-type: none"> <li>• Choose site design options that maximize preservation and function of natural areas.</li> <li>• Avoid filling open space with barely-pervious turf grass</li> <li>• Use Low Impact Design practices on parcel design</li> </ul>

# Tools & Practices

## #9

### WOODLAND/TREE CANOPY PROTECTION

A Tree Canopy Program helps communities preserve existing canopy (or restore) to maintain a certain percent coverage. The percent coverage often depends on the underlying zoning (ie. residential, commercial) of the community.

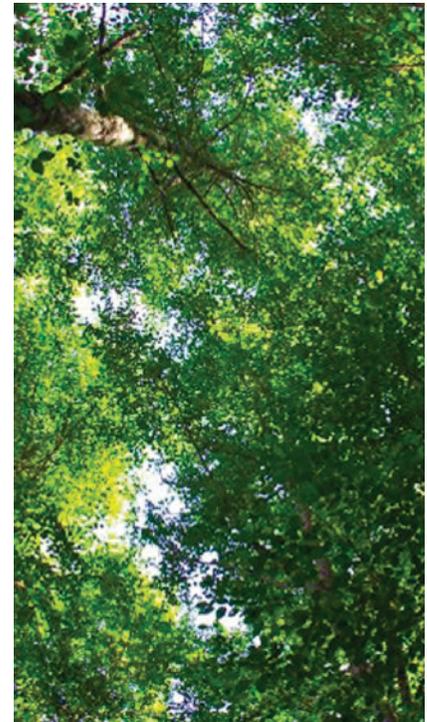
#### Key Benefits

- Stabilizes soils
- Cleanses stormwater helping to improve water quality
- Reduces flooding problems by managing stormwater
- Conserves household energy costs
- Provide wildlife habitat

Trees help support a community's quality of life by maintaining the proper functions of watersheds. A healthy forest system can reduce storm water infrastructure costs by intercepting rain, increasing ground absorption and slowing the rate of runoff. Other community benefits include: protecting drinking water supplies, enhancing property values and reducing household energy costs.

#### RECOMMENDATIONS:

- Communities should protect woodlands and valuable canopy cover by adopting measures in their codified ordinances. In the ordinances, woodland areas of likely high value to the community should be identified for further attention at the site design level.
- A minimum % coverage of forest cover should be determined for post construction goals for residential, nonresidential and varying densities. Example: The City of Roanoke, Virginia has recently adopted a 40% canopy goal with targets of 20% for commercial and industrial areas, and 50% for residential areas. Urban areas in Maryland have a target of 40% overall coverage.
- Require professional evaluation of blocks of woodland at the preliminary design stage (avoid the requirement for every tree on a site to be identified). The code should require a tree protection plan and its approval prior to permit, and assure that the plan is implemented and monitored during construction. Provisions for monitoring for at least a year after construction should be included.
- Allow applicants to seek variance to reduce lot sizes in order to preserve more natural features (i.e. forest cover, riparian zones etc.)



Brecksville has a provision (Chapter 1117.02) to incorporate natural features into the development design. It lists trees, topsoil and other natural resources should be preserved and used within the layout. Large specimen trees (18" DBH or larger) are to be preserved in the design of parking lot. Brecksville also has a city arborist which assists in the development review process.

Broadview Heights has a Shade Tree Commission which oversees the planting, maintenance and removal of street trees and all trees growing in any public area of the City.

North Royalton has a street tree "Master Shade Tree Program".

Parma has a simple tree protection provision which states, "In the erection, alteration or repair of any building, structure or other work, the owner, his agent or individual contractor shall take all measures necessary to prevent injury to public, commercial, multi-family and single family residential trees." Ordinance also mentions relying on ODNR City Forester for technical assistance.

Seven Hills has a Master Street Tree Program and a city arborist.

# Tools & Practices Woodland/Tree Canopy Protection

In order to establish canopy cover goals for a community, a community must first assess existing tree cover. There is an array of technology to accomplish this including GIS, aerial photographs, satellite images, and/or ground surveys. Using this benchmark data, the community must then decide, “What is a reasonable canopy goal for them to try to attain in a given period of time”? These goals should reflect both conservation efforts and planned restoration activities on public and private lands. Goals may be set for an overall canopy target for the jurisdiction or they may vary by land use— such as residential, industrial/commercial, streets, and/or parks and open spaces. American Forests recommends that urban areas strive for 40% canopy overall, 50% canopy in suburban residential areas, 25% canopy in urban residential areas, and 15% canopy in commercial areas.

There are four stages in the development process at which tree protection provisions can be applied:

- (1) Preliminary design – identifying woodland areas on a site or in a community which are of high value for preservation
- (2) Specific design – identifying specific trees on the site which will be preserved and those which will be removed, and specifying methods for protection of those to remain
- (3) Construction protection – implementation of the specifications for protection of trees during the construction process;
- (4) Post construction monitoring – ongoing evaluation of tree health after construction and implementation of recommendations for remedial care if necessary

Example:

1. Maryland Forest Conservation Act- Areas that are deforested by development must be partially reforested to:
  - 25% of the pre-development forest for medium density residential development;
  - 20% for high-density residential;
  - 15% for commercial, industrial, or mixed use and
  - 50% for agricultural and resource areas.
2. Olmstead Falls’ Tree Preservation & Management (Chapter 1218) ordinance helps preserve and replant trees. The ordinance organizes tree management into A. Natural Undisturbed Areas; B. Buffer Zones or Screening Areas and C. Wooded Areas within Buildable Property. All new development must be designed to preserve healthy trees and woodlands. Minimum standards-
  - minimum of 40 caliper inches /acre (not including the natural undisturbed, buffer zones or wooded area within buildable property
  - Newly planted trees have a minimum size of 2 caliper and maximum size of 6 caliper.
3. Springfield Township’s Tree Preservation Ordinance (Chapter 550.5) states existing woodlands shall be maintained and preserved. On residential and nonresidential development:
  - A minimum of 50% of mature woodlands shall be preserved
  - A minimum of 25% of young woodlands shall be preserved and
  - Large, solitary trees (of a certain caliper), not in conflict with structures, shall be preserved to the extent practicable.

## Community Forest/Tree Canopy Protection

COMMUNITY	Woodland or Canopy Protection Ordinance	Provision to Protect Trees During Construction	Required # or % of Canopy Coverage
Brecksville	No	No	No
Broadview Heights	No	No	No
North Royalton	No	No	No
Parma	No	No	No
Seven Hills	No	No	No

Caliper Inches is the diameter in inches of the tree trunk twelve (12) inches above the base of the tree

# Tools & Practices

## Woodland/Tree Canopy Protection

KEY ROLES	KEY ACTIONS
Legislators, Planning Commissions	<ul style="list-style-type: none"> <li>• Establish forest cover goals for your community. American Forests recommends that urban areas strive for 40% canopy overall, 50% canopy in suburban residential areas, 25% canopy in urban residential areas, and 15% canopy in commercial areas.</li> <li>• Goals should reflect both conservation efforts and planned restoration activities on public and private lands.</li> <li>• Apply forest protection provisions at various stages in development:               <ul style="list-style-type: none"> <li>• Preliminary Site Design – Identify high value woodland areas for preservation</li> <li>• Identify specific trees to be preserved and specify protection methods. Measure canopy cover and/or caliper inches of trees to be removed and determine the method of replacing a comparable volume of forest cover on site or in a forest mitigation bank.</li> <li>• Mandate protection of trees and avoidance of soil compaction during construction</li> <li>• Monitor tree/forest health and require maintenance on an ongoing basis post-construction</li> </ul> </li> <li>• View forest cover as infrastructure, and provide funds to maintain and improve your urban forest</li> <li>• Require developers to follow forest cover goals and integrate planting areas into parking lots to reduce runoff.</li> </ul>
Zoning Appeals Boards	<ul style="list-style-type: none"> <li>• Enforce codes that support preservation</li> <li>• If variances are allowed that remove forest cover, require mitigation</li> </ul>
Administration, Economic Development, Community Development	<ul style="list-style-type: none"> <li>• Work with private landowners to establish forest mitigation banks of land to accommodate replacement of lost canopy cover</li> <li>• Recognize the infrastructure value of woodlands and factor into the equation as assets</li> </ul>
Tree Commissions	<ul style="list-style-type: none"> <li>• Educate and encourage landowners to preserve, restore or increase tree and forest cover on private land</li> <li>• Create a forest mitigation fund where developers or landowners who remove trees, but whose site cannot accommodate replanting, can contribute payments in lieu of planting, and use those funds to plant, improve or maintain tree canopy and forest cover on public lands and rights-of-way.</li> </ul>

# Tools & Practices Woodland/Tree Canopy Protection

KEY ROLES	KEY ACTIONS
Stewardship Groups	<ul style="list-style-type: none"> <li>• Support forest preservation, and especially increased planting, throughout the community</li> <li>• Sponsor tree planting events, seedling giveaways, and adopt-a-forest programs</li> <li>• Work with governments and private landowners to designate planting sites.</li> <li>• Educate landowners, especially in commercial and residential areas, about the importance of letting forested areas “go natural”, letting volunteer understory trees, shrubs and vegetation take hold, and allowing leaves to remain to form new soil. Discourage the practice of removing fallen leaves and replacing with store-bought mulch. Let the trees mulch themselves.</li> </ul>
Residents, Property Owners and Property Managers	<ul style="list-style-type: none"> <li>• Retain and maintain forested areas, including tree canopy, understory and ground level vegetation.</li> <li>• Restore forested connections between segments of woodland to support wildlife habitat, establish greenways and improve forest function.</li> <li>• Do not rake leaves from woodlands.</li> <li>• Allow “volunteer” seedlings to grow.</li> <li>• Aim for at least 40% of property to be planted, to to naturally revert to woodland.</li> <li>• Plant native trees and understory vegetation.</li> </ul>
Developers	<ul style="list-style-type: none"> <li>• Design sites to include ample forest cover, preferably in areas where they can reduce surface water runoff.</li> <li>• Incorporate trees throughout parking areas to absorb forestRESIwater and shade vehicles. Surround “tree boxes” with pervious paving strips and fashion the boxes or curbs with ground-level holes to allow runoff from paved areas to enter the root system.</li> <li>• Resist the temptation to rake and mulch under trees – use lower level plantings and ground cover that requires minimal maintenance and reduces root disturbance</li> </ul>

## PRIORITIZING TOOLS FOR WATERSHED MANAGEMENT

The Watershed Partnership was asked to prioritize management tools and strategies that they would like implemented throughout the watershed. These management tools would help address a wide range of issues through planning measures, design standards, regulations, inter-community cooperation, funding etc.

Overall, on-site stormwater design practices was the most important, followed by protecting the riparian corridor, adopting the critical watershed features map for community guidance, and protecting flood zones.

This prioritization helped guide and focus recommendations to the communities.

TOOLS & PRACTICES	TYPE	#	%
On-site storm water retention practices	Design Standard	70	97%
Protect canopy in Riparian Corridor	Plan & Regulation	70	97%
Adopt Critical Watershed Features Map as Guidance for Community Conservation	Plan & Regulation	67	93%
Setback- Flood zones to protect function	Regulation	67	93%
Setback Flood zones to eliminate encroachment	Regulation	65	90%
Preserve intact mature canopy	Plan & Regulation	65	90%
Setbacks- Wetlands	Regulation	64	89%
Mandatory Conservation Development- 40% OS	Design Standard	64	89%
Setbacks on Critical Soils	Regulation	63	88%
Setback- Steep Slopes	Regulation	62	86%
Permanent establishment of Chippewa Group	Inter-Community Cooperation	62	86%
Regulatory consistency in communities	Inter-Community Cooperation	62	86%
Promote conservation easements	Individual Behavior	62	86%
Minimize paving- promote filter strips	Design Standard	61	85%
Seek grants for funding projects	Funding	61	85%
Cooperative planning and funding	Inter-Community Cooperation	60	83%
Develop on going monitoring and reporting and feedback	Measurable Outcomes	60	83%
Setbacks- Riparian Corridor	Regulation	58	81%
Cooperative code enforcement- shared resources	Inter-Community Cooperation	58	81%
Link education and outreach to Phase II PIPE	Individual Behavior	58	81%
Include watershed education in Community Newsletters	Individual Behavior	58	81%
Develop list of restoration/preservation projects	Restoration / Preservation	58	81%
Link riparian corridors to park connections	Restoration / Preservation	56	78%
Direct acquisition of critical watershed features	Restoration / Preservation	55	76%
Mitigation bank and credits in the watershed	Financial Incentives	52	72%
Develop annual grant match sinking fund	Funding	52	72%
Restore native species	Restoration / Preservation	47	65%
Allow & promote smaller, native lawns	Design Standard	46	64%
Seek SEPs for funding projects	Funding	42	58%
Offer riparian plant packages	Plan & Regulation	36	50%
Tax based incentives to land owners	Financial Incentives	31	43%
Cooperative funding model to implement measures	Inter-Community Cooperation	27	38%

## In Conclusion:

Continued support by the communities of Chippewa Creek, the Watershed Planning Partnership and the Cuyahoga River RAP will be essential for ongoing improvement and stewardship within the watershed.

## Recommendations

### Short Term

- Establish an official Chippewa Creek Watershed Partnership-

The local watershed group should be predominantly comprised of local officials and citizens and an advisory role for local organizations and agencies. The group will help establish permanent representation for Chippewa Creek, implement the BGI recommendations and focus on future watershed objectives.

- Adopt a resolution among the watershed communities to formally recognize the Balanced Growth Plan-

The participating jurisdictions should agree to a Resolution which outlines the relationship and obligations of the jurisdictions within the Chippewa Creek BGI Watershed Plan. This step is critical to receiving state endorsement and future financial incentives.

- Submit BGI Plan to the State for approval-

The final BGI Plan will be submitted to the Ohio Lake Erie Commission for approval. Once the plan has endorsement from the State, financial incentives for conservation and development areas become available.

### Long Term

- Incorporate the PCA / PDA map into local master plans and zoning maps. Each jurisdiction's elected officials and approving bodies should follow their established public review processes for plan adoption. (See Best Local Land Use Practices- Practice #1)
- Update local ordinances and zoning codes as recommended in the plan- Each jurisdiction should update land use policies and documents, including comprehensive plans, zoning and subdivision regulations, to ensure consistency with the BGI Plan. Jurisdictions should work together on this task. ,
- Create uniform storm water codes throughout the watershed- this is to ensure that watershed protection and site development review processes are fair, consistent and apply evenly to all areas of the watershed as development and plan implementation moves forward.
- Explore developing a Transfer Development Rights / Purchase Development Rights / Density Transfer Program- As a long term goal, Development Rights Programs should be considered as part of the tool box of options to achieve conservation and direct development away from sensitive areas.
- Develop a mitigation banking system for wetlands and streams- Streams and wetlands need to be protected. Should an unavoidable impact occur, a compensatory mitigation plan needs to be ready to keep these critical resources in the watershed. (The Cuyahoga River RAP is in discussions with the Ohio Lake Erie Commission to facilitate a program for Chippewa Creek.)
- Identify needed Restoration and Enhancement Sites in Chippewa Creek Watershed- wetland sites in the watershed are currently being analyzed for restoration and enhancement potential. These wetland results, along with stream data, will be shared with the partnership and targeted for funding and remediation..
- Revise and update plan when needed- As different projects or watershed needs become apparent, additional chapters should be added to the BGI Plan.



# CHIPPEWA CREEK

## WETLAND & STREAM MITIGATION IN CHIPPEWA CREEK WATERSHED

Wetlands, streams and natural riparian corridors provide important stormwater services to the Chippewa Creek Watershed. Maintaining the **quantity** and **quality** of these natural resources provides economical and environmental protection to the watershed communities.

Before anyone can impact a wetland or stream, they must obtain a Clean Water Act Section 401 water quality certification or Isolated Wetland permit from Ohio EPA and also must obtain a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers.

When a wetland or a stream is filled or impacted, typically from development, actions must be made to compensate for the loss.

**This compensation is termed *Mitigation*.**

These watershed impacts, however small, over time can cause watersheds to lose their capacity to manage stormwater. As a result, communities will experience more frequent flooding and erosion problems and costly repairs.

To minimize this loss, a compensatory mitigation project should be located close to the source of impact.

**This means that mitigation should stay within the Chippewa Creek Watershed.**

Mitigation can be in the form of:

- restoration
- creation
- enhancement, or
- preservation

### MITIGATION PROJECTS

The Cuyahoga River Community Planning Organization is currently developing mitigation projects for wetlands in Chippewa Creek and the rest of the Lower Cuyahoga River Basin.

There are two over-arching goals to the project:

1. Keep mitigation projects within the Chippewa Creek Watershed
2. Prioritize wetland mitigation opportunities

This will help direct efforts to key wetland sites that can help maximize stormwater management and nonpoint source pollution control.

The Cuyahoga Wetland Project will help identify the top 10 wetlands sites in each tributary watershed, including Chippewa Creek, that should be targeted for future protection.

A wetland scoring methodology will be developed to identify the key wetland sites.

The restoration potential of each site will be included along with a library of unit cost factors to develop reasonable cost estimates.

**Please note:** The Cuyahoga Valley National Park currently has eligible wetland and stream mitigation projects available. Contact Kevin Skerl at 330-650-5071 ext.4 for more information.

# Appendices

- A. Incentives
- B. State Assistance Work Group (SAWG)
- C. Streamlining and Predictability
- D. State Program Inventory
- E. Special Incentives