Furnace Run
Watershed Plan
Balancing Growth and Watershed Stewardship
2011

FURNACE RUN WATERSHED PLANNING PARTNERSHIP

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Acknowledgements

This watershed plan was developed by the Cuyahoga River Community Planning Organization (CRCPO) in cooperation with the Furnace Run Watershed Planning Partnership.

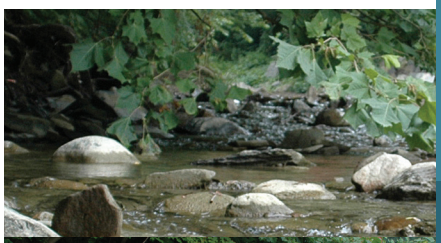
ABOUT THE FURNACE RUN WATERSHED PLANNING PARTNERSHIP

The members of the Furnace Run Watershed Planning Partnership are appointed by the mayors of the 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 restoration efforts and long term community stewardship of the Cuyahoga River Watershed and Area of Concern.

Additional support for the work of the Furnace Run Watershed Partners comes from:
Kelvin Rogers, OhioEPA



Furnace Run

Ohio Balanced Growth Program

Watershed Plan

2011

The Furnace Run Balanced Growth Initiative is a community-driven land suitability plan that will assist communities in balancing economic growth with conservation of critical and valuable natural resources in the Furnace Run Watershed.

The goals of the Plan are to

- Preserve, restore and enhance existing watershed features
- Promote development and redevelopment that balance economic growth and watershed function
- Recommend land use practices that best avoid or minimize impacts on the watershed and stream resulting from development

Furnace Run is one of the healthiest and most-intact streams in the Cuyahoga River watershed. Major portions of the watershed are within Metroparks Serving Summit County and the National Park Service, affording it a higher-than-average level of attention and stewardship.

Urbanization that has taken place in the upper watershed is in the form of large-lot residential development where extensive stream systems are largely protected for the value they add to properties. Commercial development comes primarily in proximity to major freeway interchanges and major roads. Farmland remains, and the watershed communities have, for the most part, avoided the kind of commercial sprawl that would threaten the Run.

However, Furnace Run is only in partial attainment for aquatic life, and significant bank erosion is occurring in the lower Run where excessive siltation covers the stream bottom. Addressing watershed protection, and planning now for future stresses, offer opportunities for stewardship that will be necessary for long-term watershed health.

The watershed communities have taken this opportunity to look at their watershed in terms of its natural elements and their functions, and to base future land use planning on scientific analyses of where development and conservation will most effectively protect these resources.

This Plan presents input from community representatives, and the data and portrait of the watershed they used when identifying Priority Conservation Areas, Priority Development Areas and Priority Agricultural Areas. It also contains detailed data on wetlands and selected sites, as well as lists of the tools and strategies the partners will use to implement the plan.

Building and strengthening stewardship, and supporting land use planning for watershed health in the river's tributaries, are essential parts of the Cuyahoga River Remedial Action Plan for delisting beneficial use impairments in the Cuyahoga River. The Cuyahoga River Community Planning Organization is working with local governments, Metroparks Serving Summit County, the Cuyahoga Valley National Park and other partners to support stewardship in Furnace Run.

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This project was funded in part through the Lake Erie Protection Fund which is administered at no cost to the Fund by the Ohio Lake Erie Commission. The LEPF is supported through the voluntary contribution of Ohioans who purchase the *Erie…Our Great Lake* license plate featuring the Marblehead Lighthouse.

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Furnace Run

Ohio Balanced Growth Program

2011

Executive Summary

Furnace Run is a tributary watershed of the Cuyahoga River in Northeast Ohio, an area of steep terrain and deep wooded ravines that has retained much of its rural atmosphere despite being in the direct line of outward migration from Cleveland's and Akron's metropolitan areas. This, in spite of the fact that the land is traversed by three interstate highways, one of which is the Ohio Turnpike, and two major interchanges, and is immediately adjacent to vast areas of popular and highly-visited parklands.

Nearly a third – 31.8% – of the watershed is parkland, encompassing most of the land in the eastern half of the watershed and all of the final 20% of the land before the stream joins the Cuyahoga where Cuyahoga Falls and Boston Township meet. All but the outer edges of the watershed, whether or not they are under the protection of either Metroparks Serving Summit County, the Cuyahoga Valley National Park or the Cleveland Metroparks, are riddled with steep slopes that make exurban-style development challenging except in areas already in use for agricultural purposes.

The potential for imbalance between development and conservation looms large, as does the challenge of providing local revenue when so much land needs to be protected.

The Furnace Run communities have a history of promoting regional collaboration and cooperation. With approval from 75% of the watershed land area (the number of communities and share of the population required in order to receive State of Ohio endorsement,) such collaboration is imperative.

The Partnership was formally organized for the purpose of participating in the development of the BGI Watershed Management Plan. The communities are currently active in watershed stewardship and embrace shared goals for the watershed. Brecksville and Broadview Heights were both active supporters and participants in the Chippewa Creek Balanced Growth Watershed Management Plan. Mayor Mike Lyons of the Village of Richfield serves on the CRCPO Board, has been an active leader in a number of regional collaboration initiatives, and has led this Partnership in its effort to protect and preserve key elements of Furnace Run.

After reviewing updated maps of critical watershed features, studying existing land uses, the group worked to identify the criteria they would use to define what areas of the watershed would be classified as high priority areas for either conservation, development or agricultural use. Based on those criteria, the group identified a total of 21 Priority Conservation Areas, 11 Priority Development Areas and 3 Priority Agricultural Areas.

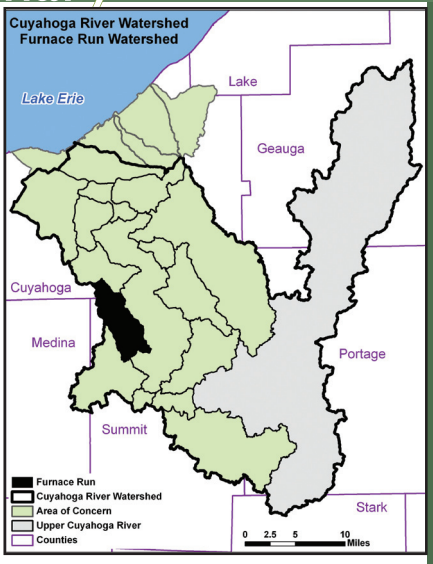
Each Area was measured, evaluated and analyzed to identify the appropriate tools and strategies to reach the group's goals for the site.

On completion of the Plan and its presentation to the watershed communities for their adoption, CRCPO will continue to provide support to the Partnership as each community moves toward implementing the strategies.

Furnace Run is a primary contributor of sediment to the Cuyahoga River, making erosion and soil stabilization a major concern for watershed communities.

Executive Summary
Furnace Run

The Furnace Run watershed drains approximately 20.34 square miles of predominantly suburban lands. 2002 satellite land cover analysis determined that approximately 14% of the watershed is considered urbanized with generally impervious surfaces. The remaining 86% of the watershed is comprised primarily of wooded (47%), grass/ agricultural (34%) and shrub/ scrub (7%) land cover (Cuyahoga River RAP-2002)



Special Park Features

Furnace Run Metro Park, totaling 870 acres on seven tracts located in Richfield Township and Richfield Village, is operated by Metroparks Serving Summit County The tracts are fragmented east-west by Interstate 77, State Route (SR) 21, and Brecksville Road, and north-south by Brush Road and State Route 303; however, two of the southernmost tracts, approximating 43 acres along Wheatley Road, are disjoined from the remainder of the park and ecologically separated by Interstate 271.

The Cuyahoga Valley National Park (CVNP,) which contains 30,000 acres of wetland and forest along the Cuyahoga River from Akron to Cleveland, also has property within the Furnace Run Watershed. Furnace Run Metro Park is adjacent to Cuyahoga Valley National Park. Because of the enormous appeal of these parks there is increasing pressure on the watershed and downstream park assets resulting from adjacent urbanization.

The Cleveland Metroparks system has recently taken over management of the property that contains the northernmost section of the watershed, where they intend to naturalize 500 acres in and around a golf course.

MAJOR ISSUES IN THE FURNACE RUN WATERSHED

1) Steep, fast draining, high-energy stream with limited potential for storm water storage in which upstream and headwater urbanization adds discharge volume and energy.

2) The stream is the top sediment producer to the Cuyahoga River, where erosion and sediment are negatively impacting park resources. TMDL cites sediment and nutrients as leading stressors to the Cuyahoga River.

3) Community goals to preserve rural / small town atmosphere and preserve or enhance vital greenspace in riparian corridors while also promoting quality economic development.

4) Highly desirable communities of the watershed are under steady development pressure, especially in headwater and upstream locations near highway interchanges.

5) Close proximately to highway network and mid-location between Akron and Cleveland provide market opportunities for office parks and related infrastructure.

6) Underused and newly vacant employment centers provide excellent opportunities for Priority Re-development Areas and exploration of State economic development incentives with respect for the watershed.

Furnace Run enters the Cuyahoga River at mile 33.08, in the Cuyahoga Valley National Park.

Drainage area: 20.34 Sq miles

Hydrologic Unit Code:
HUC-14 04110002-040-050

Main stem Length: 10.4 miles

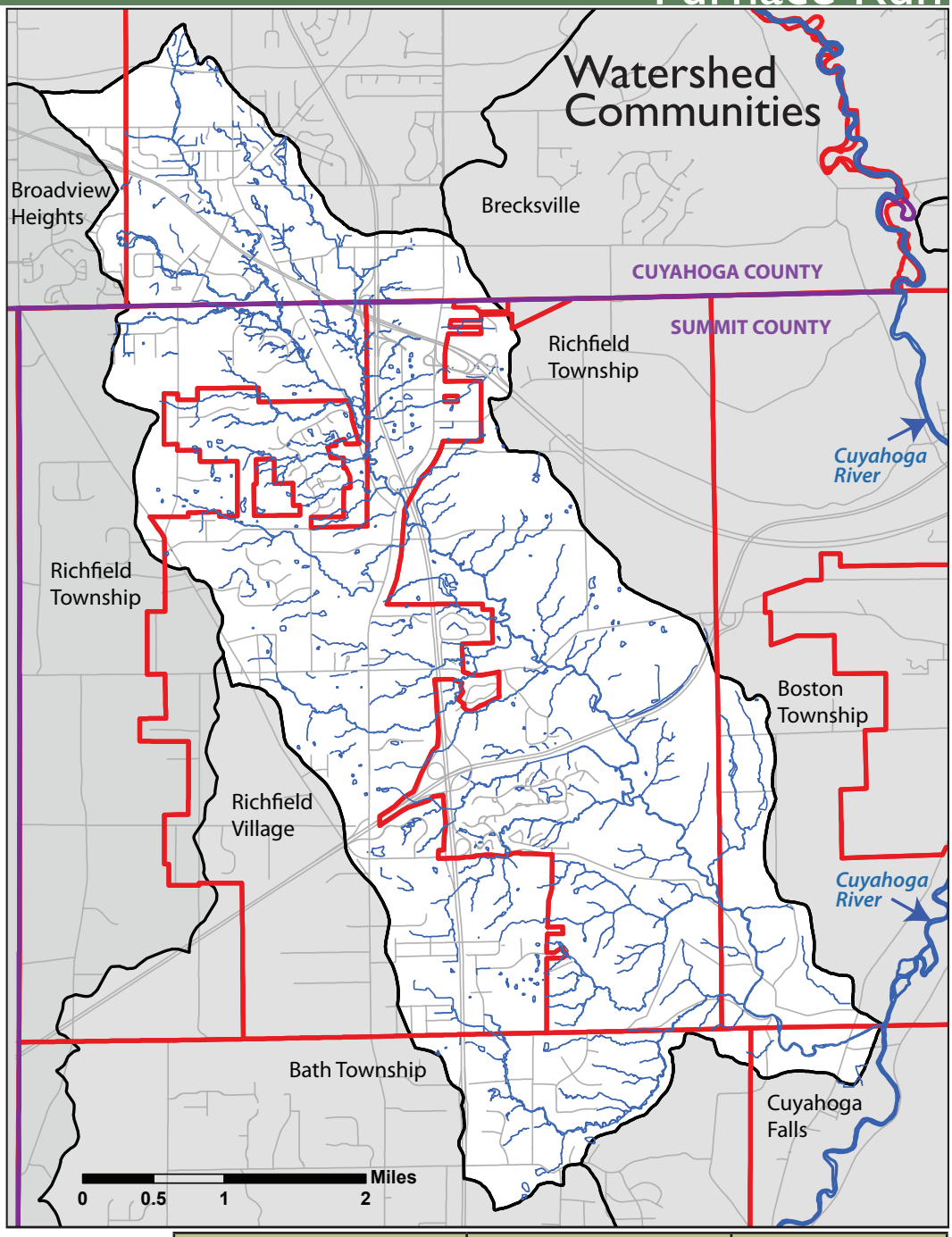
Gradient: from 1252 ft to 69 ft, dropping 561 feet: average fall of 54 feet per mile.

Water quality: meets OEPA water quality standards, but threatened.

See pp. 6 - 8 of Plan

Furnace Run originates in Brecksville, Broadview Heights and Richfield Village and Township in southern Cuyahoga and northern Summit counties in northeast Ohio.

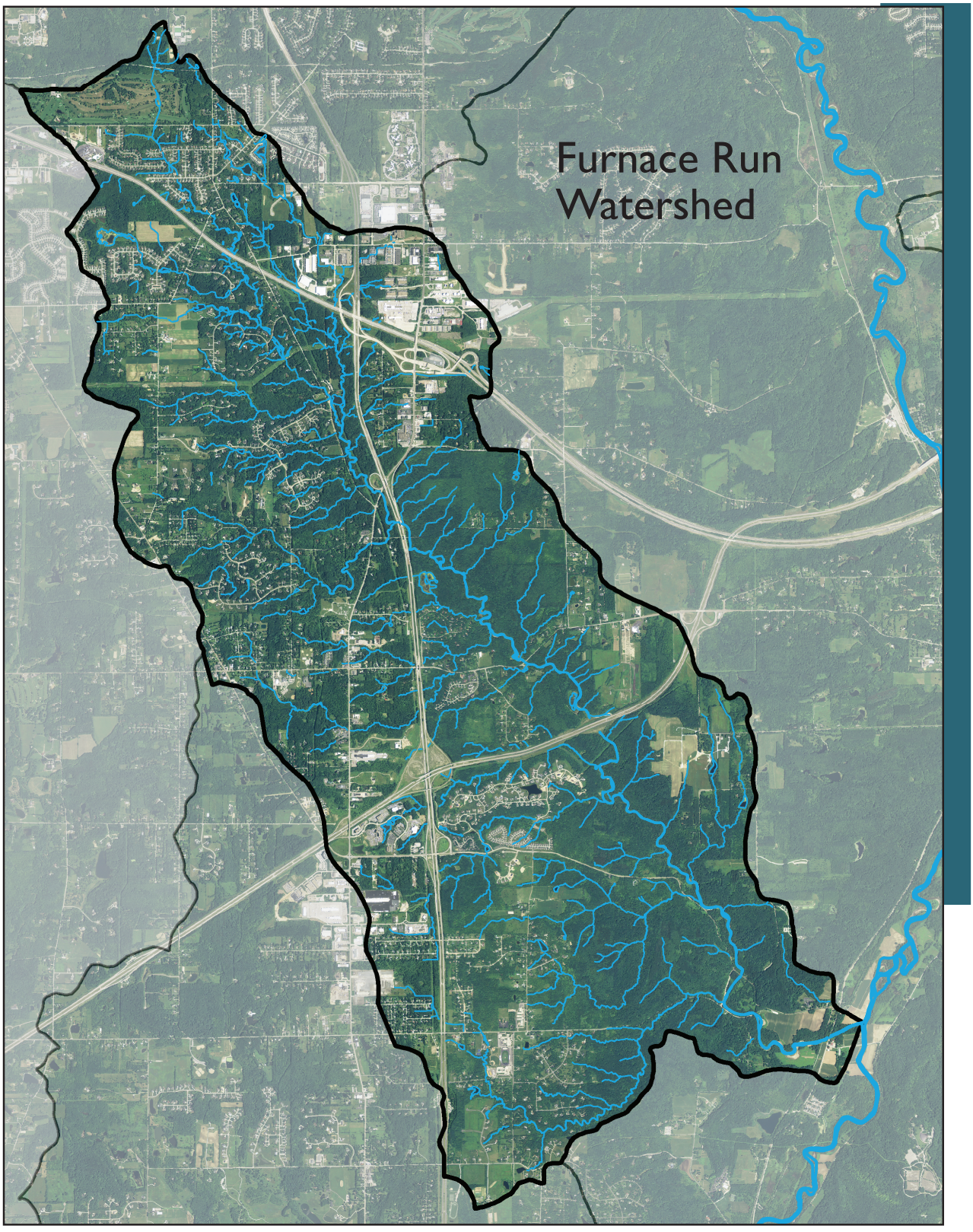
Flowing approximately 10.4 miles southeast through Richfield, Bath and Boston Townships, it joins the Cuyahoga River at river mile (RM) 33.08 in the Cuyahoga Valley National Park.



Communities in the Furnace Run Watershed	Municipal Composition (% of Watershed)	Population in Watershed (2008)
Richfield Township	45.4	2,880
Village of Richfield	25.3	2,104
City of Brecksville	13.1	1,828
Bath Township	7.1	626
Boston Township	6.0	88
City of Broadview Heights	1.7	405
City of Cuyahoga Falls	1.4	552
Total	**100**	**8,483**

* The parts of Boston Township and Cuyahoga Falls in the Furnace Run watershed lie wholly within the Cuyahoga Valley National Park.

Furnace Run Watershed



Developing the Plan

See pp. 2, 3, 12, 14, 15 - 29 of Plan

The process for developing the Furnace Run Balanced Growth Plan began with the organizing of the Furnace Run Watershed Planning Partnership, representatives and residents of seven local governments and two park districts.

Once organized, the partners met regularly to complete the following tasks:

1. identify and evaluate community issues and desires
2. GIS data analysis & qualitative assessment of Furnace Run's natural features to reflect community needs & watershed function
3. identify Criteria for prioritizing priority conservation, development and agricultural areas
4. identify and analyze potential Priority Conservation Areas (PCAs)
5. identify and analyze potential Priority Development / Redevelopment Areas (PDAs)
6. identify and analyze potential Priority Agricultural Areas (PAAs)
7. identify and analyze undeveloped land for designation as PCA, PDA/PRA, PAA.
8. Review community ordinances, identify tools, practices & strategies for community stewardship, and prioritize action items.

DEVELOPING EVALUATION CRITERIA
for Priority Conservation, Agricultural and Development Areas

See pp. 30 - 33, 76 - 77, 82 - 83 of Plan

Identifying Priority Conservation Areas (PCAs,) Priority Development Areas (PDAs,) and Priority Agricultural Areas (PAAs) began with identifying community needs.

Over the course of numerous Watershed Planning Partnership meetings we solicited feedback from the partners to help shape the evaluation criteria for identifying priority 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 functions, and each person was asked to rank the importance of each item.

The survey determined which factors mattered most to the communities. The top scoring watershed features and issues were 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. Additional consideration was made for certain sites currently and potentially used for agricultural, which has become a significant land use in the area.

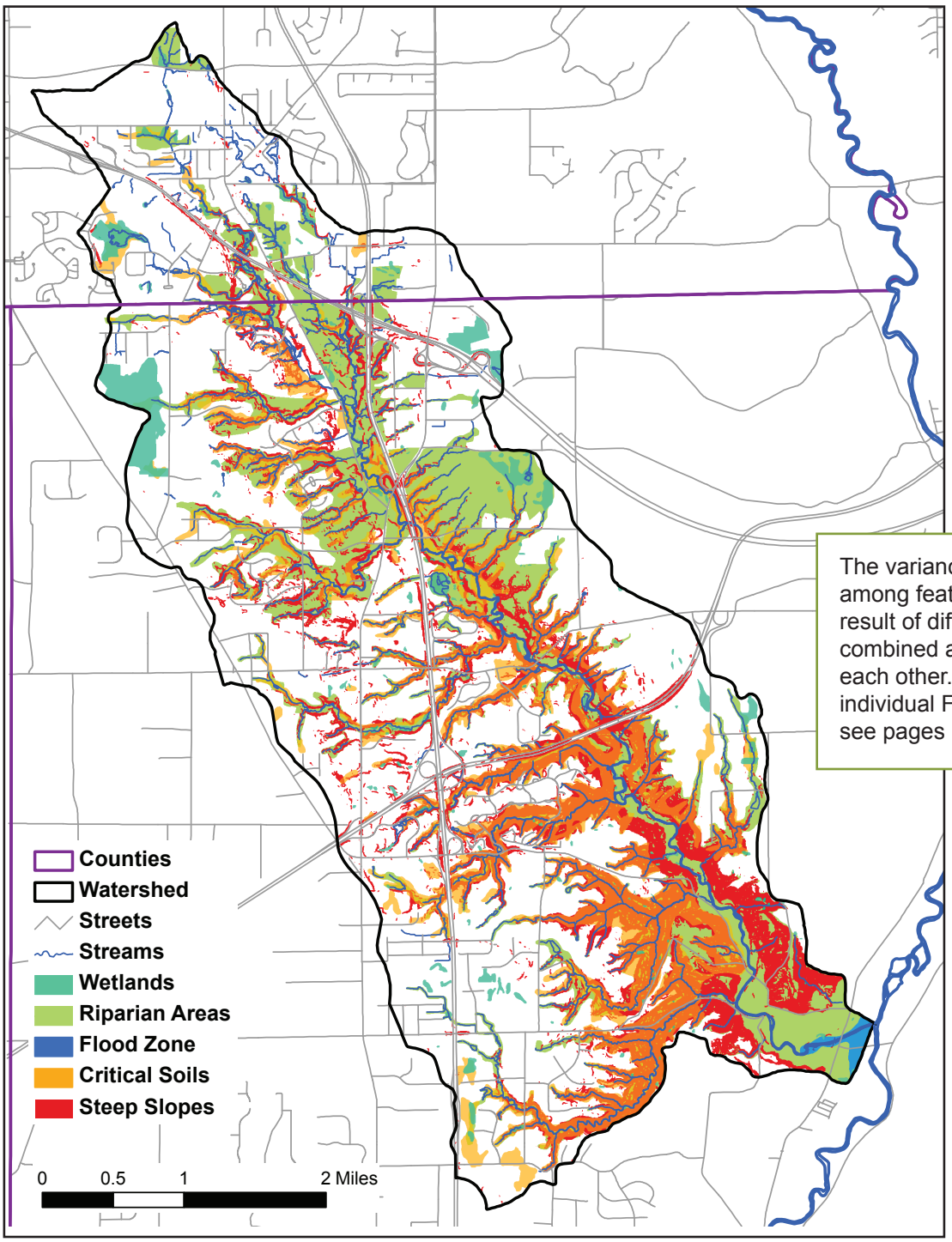
Executive Summary
Furnace Run

The natural features that are the focus of study when addressing how effectively the watershed functions include: soils • slopes • streams • riparian areas • flood plains • wetlands • forests.

Each feature was mapped individually to show where that feature appeared in the watershed. The maps were layered to create a master map showing all critical features. The partners agreed that all area containing any number of critical features would be named “critical feature areas” regardless of the number of features contained in the area.

This map displays the critical watershed features “layered-up”. It represents the most important functional elements of the watershed which need to be preserved or restored to assure stream functionality.

Composite of Critical Watershed Features

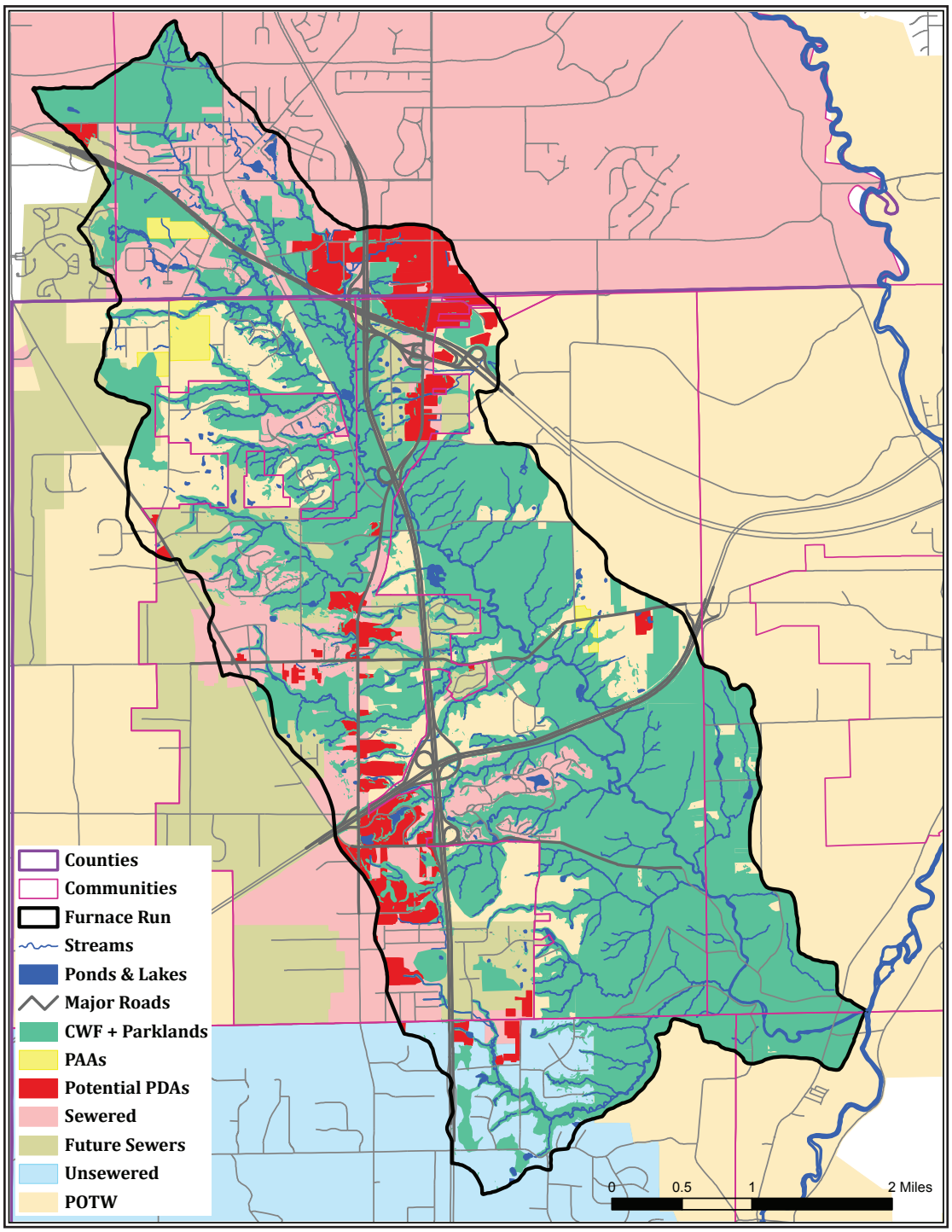


The variance in color among features is a result of different layers combined as they cover each other. To see individual Features, see pages 18 - 23.

Determining Potential Areas for Development

In order to determine areas to study for their potential to offer development opportunities, the elements analyzed include the Critical Watershed Features previously mentioned, plus: existing impervious surfaces • sewer lines • major intersections and existing commercial development.

This map displays such features, as well as all Critical Watershed Features, Priority Agricultural Areas, parklands and streams. This allows the partners to identify areas that could avoid negatively affecting important conservation areas while focusing on areas offering services and infrastructure for development or redevelopment.



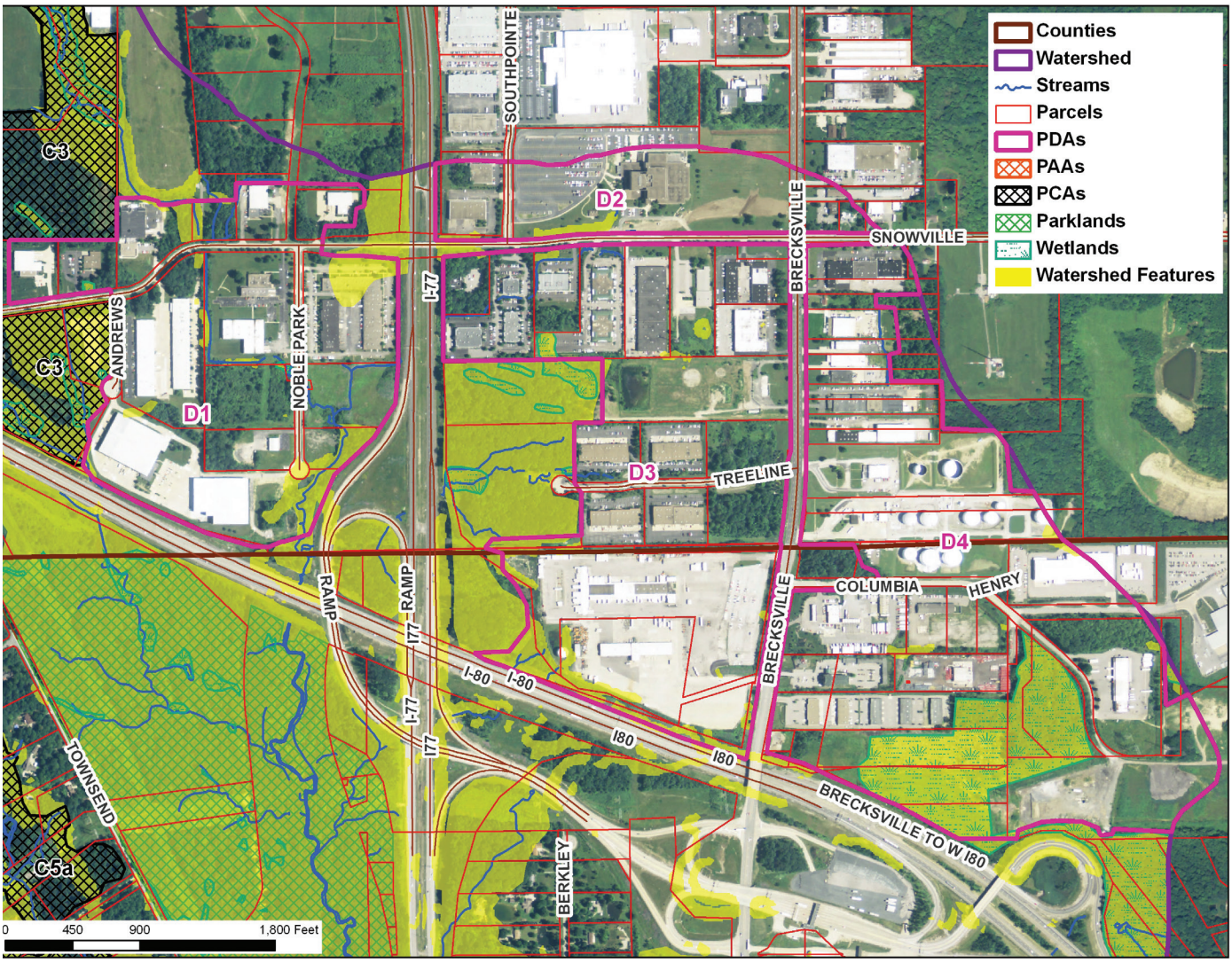
Furnace Run

The Partnership's field trip to visit several of the potential priority areas, along with analysis of Critical Watershed Features and mapping of existing built infrastructure, offered both a context for decision-making and an opportunity for partners to consider planning strategies and tools for conservation, restoration, development and redevelopment.

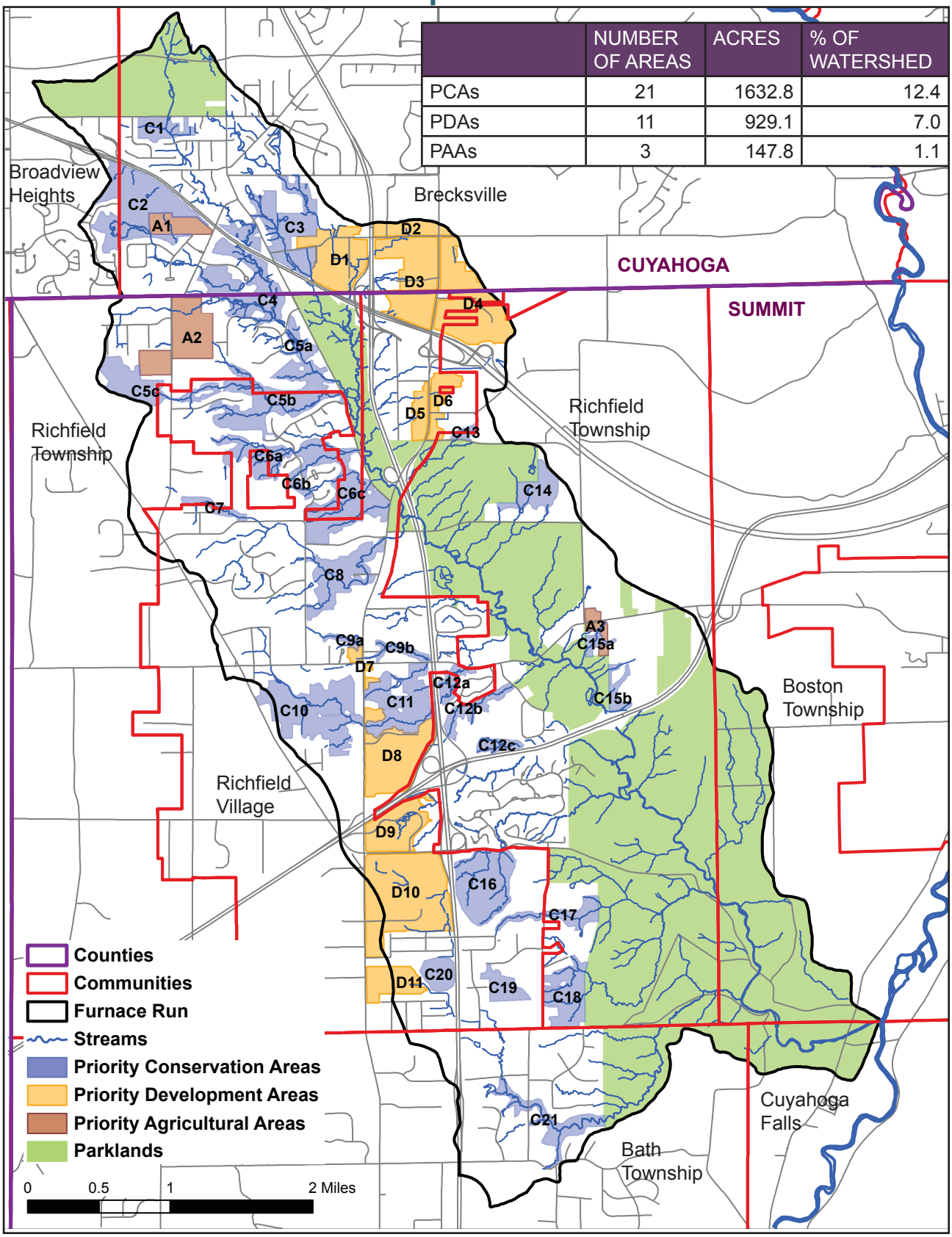
The tour also allowed a ground level appreciation of the geographic relationships among the variously-designated areas – not only where clusters of like parcels were located, but also how various uses could work to support one another.

The map on the opposite page shows the placement of all PCAs, PDAs, and PAAs as well as protected parkland, to offer an overview of how various land uses fit within the watershed,

The photo below shows an example of sites where Priority Conservation Areas and Priority Development Areas exist in close proximity, and where watershed features, highlighted in yellow, may exist within PDAs but would remain undeveloped.



Composite • PDAs, PCAs, PAAs



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 important.

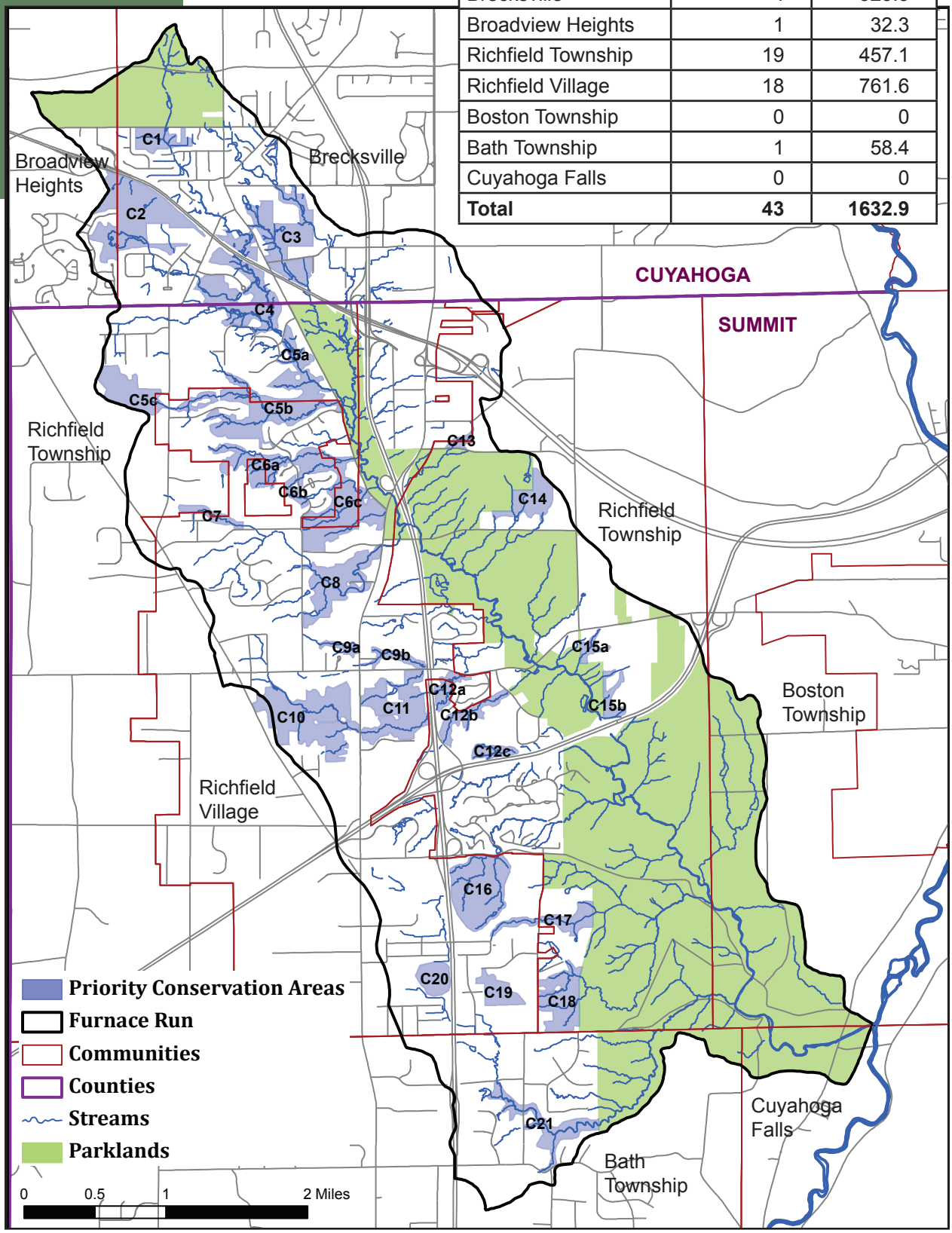
- CRITICAL SOILS
  Recommendation: In critical soil areas, communities should develop soil compaction limitations to help conserve this resource during construction. Conservation and low impact design standards are recommended.
- STEEP SLOPES
  Recommendation: In steep slope areas, communities should 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 floodplains to accommodate excess flow and to protect health and property. Community regulations need to maintain current floodplain 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.

	COMMUNITY PRIORITIES for CONSERVATION in the FURNACE RUN WATERSHED
	Listed in order of preference
1	Stream banks and adjacent vegetated corridors for erosion prevention
2	Steep slopes for erosion protection
3	Forest corridors for flow and bank stability purposes
4	Floodplains for flood water management purposes
5	Soils which are highly erosive and fragile
6	Small streams and Primary Headwater areas for flow management
7	Soils that support wetlands
8	Soils that allow high infiltration for storm water
9	Wetlands for flood water management
10	Areas in imminent danger of property damage or loss from flooding or erosion
11	Forest areas which provide significant habitat and connections
12	Wetlands for water quality and filtering
13	Stream banks and adjacent vegetated corridors for habitat benefit

See pp. 30 - 75 of Plan

Priority Conservation Areas

COMMUNITY	# OF PCAs	ACRES
Brecksville	4	323.5
Broadview Heights	1	32.3
Richfield Township	19	457.1
Richfield Village	18	761.6
Boston Township	0	0
Bath Township	1	58.4
Cuyahoga Falls	0	0
Total	**43**	**1632.9**

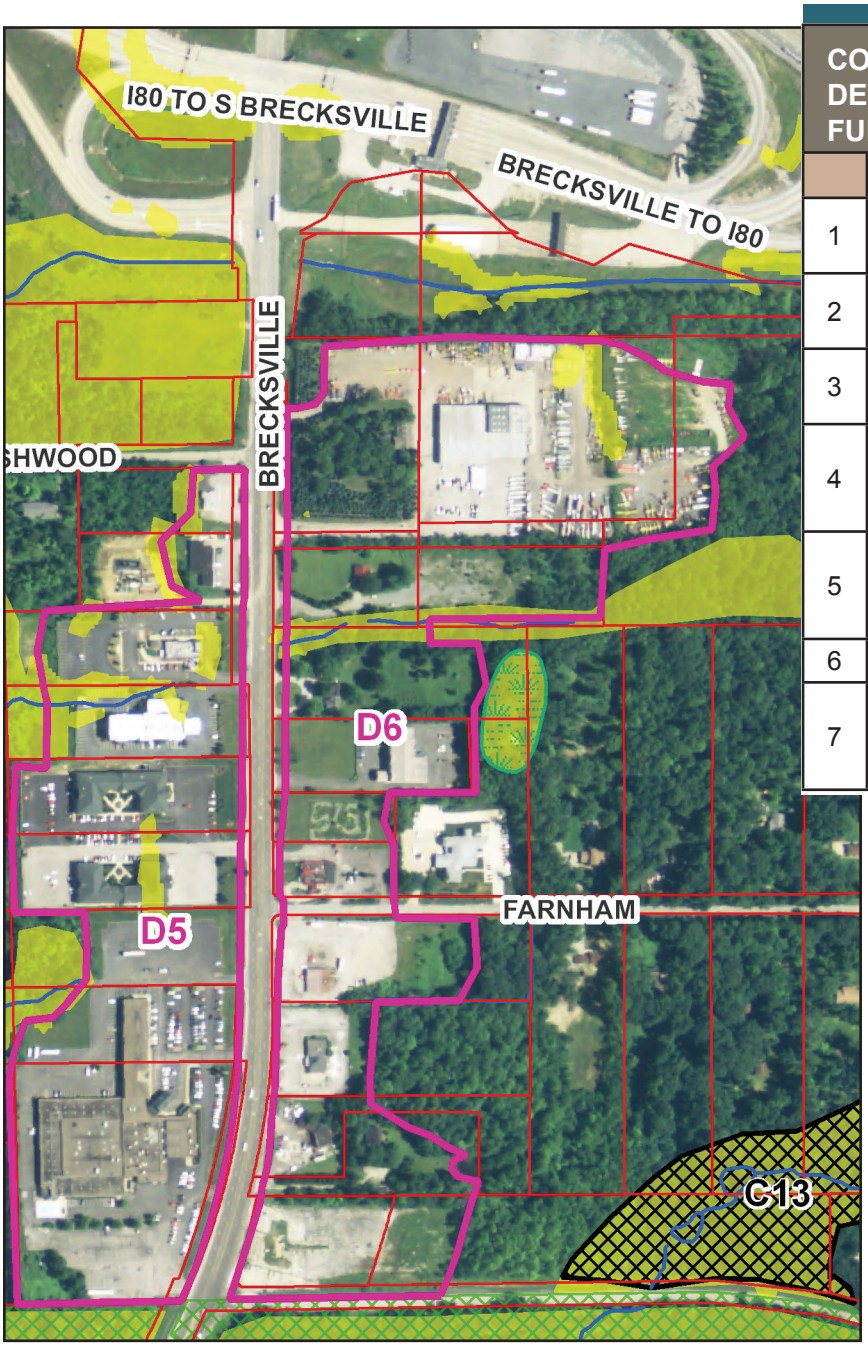


PDA

Priority Development and Redevelopment Areas

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

Criteria for determining Priority Development Areas in the Furnace Run watershed seek to promote the siting of new employment-producing development in existing urbanized areas as infill or redevelopment of underused sites.

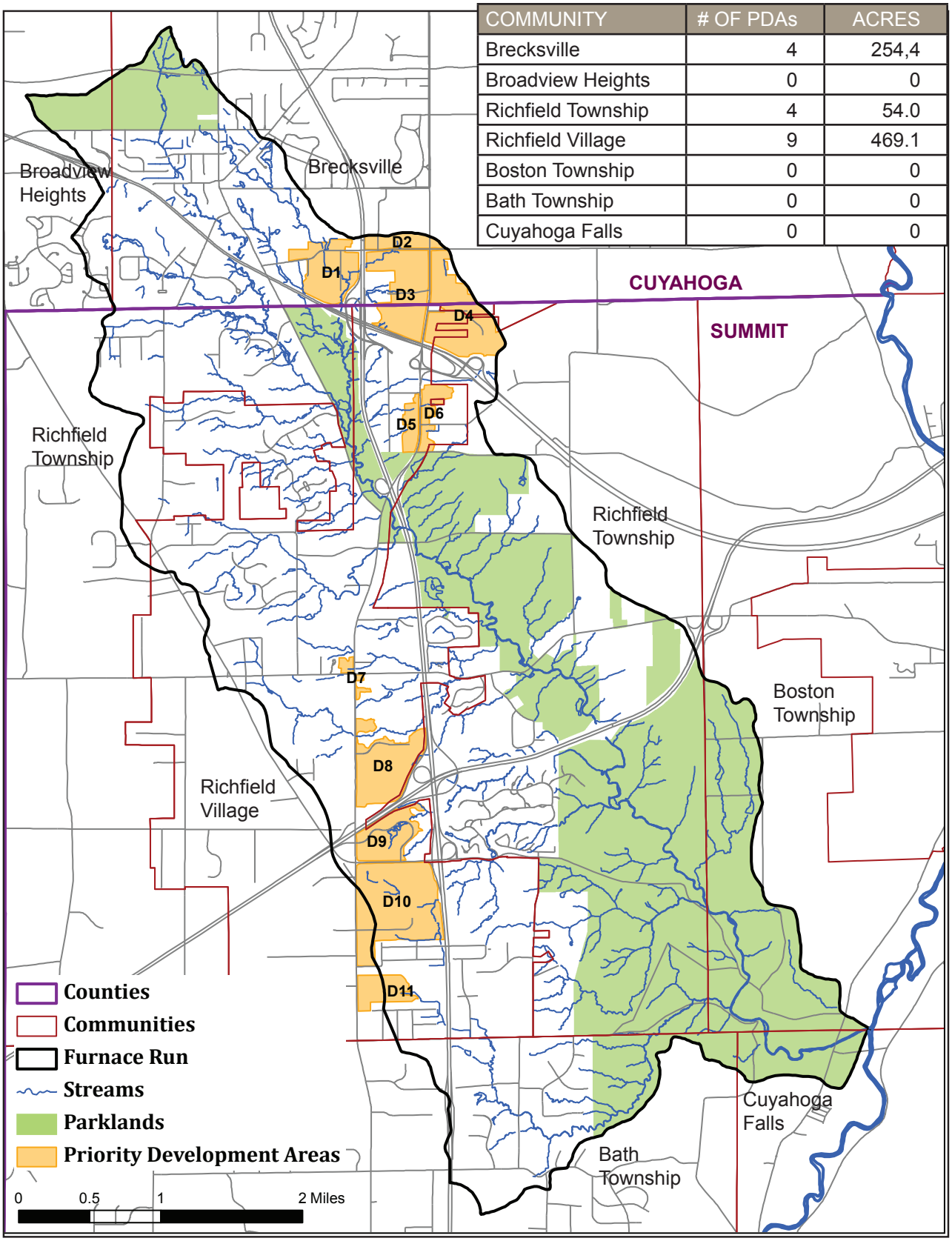


COMMUNITY PRIORITIES for DEVELOPMENT in the FURNACE RUN WATERSHED	
	Listed in order of preference
1	Land areas with adequate existing utility services: Electric/Gas/Water/Sewer
2	Existing development areas that can be redeveloped
3	Land areas already characterized by urbanization
4	Larger tracts (e.g. greater than four acres) capable of optimizing low impact development features
5	Land areas that are in close proximity to planned or existing related urban services such as retail or restaurants
6	Location on adequate primary roads
7	Areas which are located away (greater than 100 yards) from Critical Watershed Features

See pp. 76 - 81 of Plan

Priority Development / Redevelopment Areas

COMMUNITY	# OF PDAs	ACRES
Brecksville	4	254,4
Broadview Heights	0	0
Richfield Township	4	54.0
Richfield Village	9	469.1
Boston Township	0	0
Bath Township	0	0
Cuyahoga Falls	0	0



PAA

Priority Agricultural Areas

Priority Agricultural Areas are those with space, soil, topography, or other characteristics making the land or site specially conducive to highly productive agriculture or silviculture.

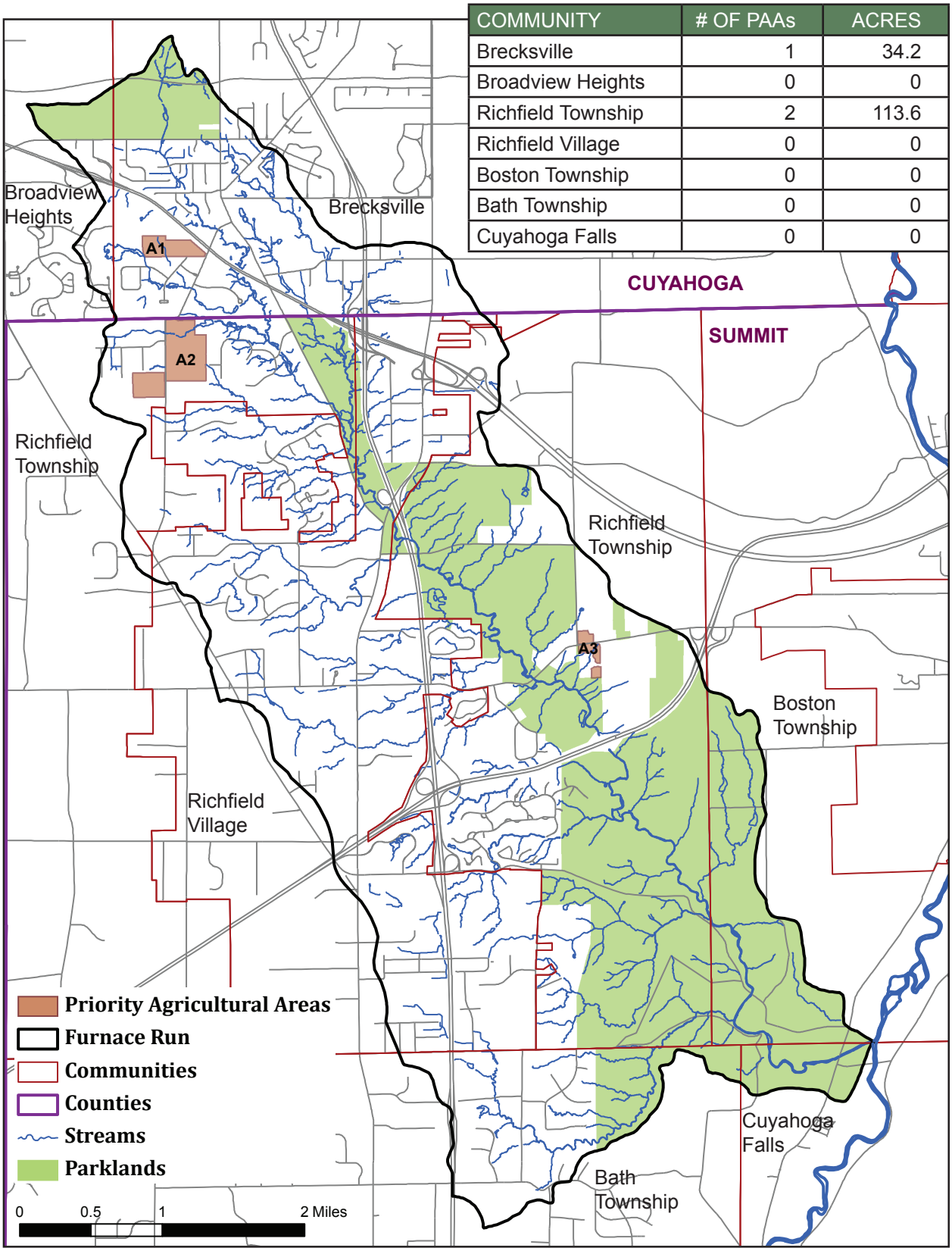
Criteria for determining Priority Agricultural Areas were based on the historic and current use of certain sites for agricultural purposes which have been highly regarded in the community.

CHARACTERISTICS of PRIORITY AGRICULTURAL AREAS in the FURNACE RUN WATERSHED	
	Land that has been used historically for agriculture, whether currently in that use or available to return to such use
	Operating farms and agricultural operations with access to commercial routes
	Areas where growing operations with value to the Local Food movement may expand
	Potential for on-site marketing and/or processing of goods
	Relationship to existing or potential conservation easements

See pp. 82 - 86 of Plan

Priority Agricultural Areas

COMMUNITY	# OF PAAs	ACRES
Brecksville	1	34.2
Broadview Heights	0	0
Richfield Township	2	113.6
Richfield Village	0	0
Boston Township	0	0
Bath Township	0	0
Cuyahoga Falls	0	0



Preferred implementation tools

The Watershed Partnership members reviewed tools typically available for promoting watershed stewardship and implementing a Watershed Management Plan.

- Some tools are regulatory and restrict potentially damaging actions
- Others are proactive to promote or reward good stream stewardship
- Some tools are designed to help to inform the citizens about the watershed and their responsibilities to promote a watershed-friendly community culture
- Some tools directly target restoration actions of important stream features

These priorities were initially defined in March 2010 and revisited and refined by the WPP in 2011 as final plan implementation goals were set. The refined implementation priorities selected by the Partnership emphasize official recognition of critical watershed features in an official map, and cooperative protection of these features through setbacks, restoration strategies and incentives:

1. Develop and adopt map of defined critical watershed features that identifies non-structural distributed storm-water storage and watershed management areas – PCAs / PDAs / PAAs
2. Adopt and enforce a consistent suite of setback regulations to protect critical stream features
   - Steep slopes
   - Riparian corridors
   - Wetlands
   - Flood zones
   - Fragile & critical soils
3. Develop a forest protection and restoration management strategy and plan
4. Adopt and promote low-impact design and on-site water retention practices
5. Restrict and promote new economic development to existing urbanized areas as infill or redevelopment of underused sites
6. Maintain the watershed partnership to sustain ongoing and planned collaborative stewardship efforts
7. Develop incentives to promote desired behaviors including:
   - Minimize paving requirements and promote infiltration and filter strips
   - Promote conservation easements

Furnace Run Balanced Growth Plan
Proposed Plan Implementation Actions & Timetable

ITEM	PREFERRED TOOL	ACTION	PROPOSED COMPLETION
1	Develop and adopt map of defined critical watershed features that identifies non-structural distributed stormwater storage and watershed management areas – PCAs / PDAs / PAAs	1) WPP recommends adoption to local governments 2) Local government adoption	November 2011 December 2011
2	Adopt and enforce a consistent suite of setback regulations to protect the critical stream features a. Steep slopes b. Riparian corridors c. Wetlands* d. Flood zones - protect & eliminate ncroachments e. Protect fragile & critical soils from erosion ** Review prioritized wetlands for possible mitigation and grant opportunities*	1) Joint ordinance review with subcommittee 2) Regular meetings of WPP, Planning Commission and BZA reps to promote watershed consistency in stream protection and enforcement 3) Seek RAP assistance	December 2011 Quarterly As needed
3	Develop forest protection and restoration management strategy and plan	WPP to participate in RAP Cuyahoga ReLEAF program	2011 - 2012
4	Adopt and promote low impact design and onsite water retention practices	1) Joint ordinance review 2) Regular meetings of WPP and local Planning Commissions and BZA reps	March 2012 Quarterly
5	Restrict greenfield development and promote new economic development in existing urbanized areas as infill, adaptive reuse or redevelopment of underused sites	1) Regular meetings of WPP, local Planning Commissions, BZA reps and Economic Development departments 2) Seek grants for economic development in PDAs with Ohio Lake Erie Commission assistance.	Quarterly As needed
6	Maintain Watershed Partnership to sustain ongo-ing and planned collaborative stewardship efforts	Recommend to local governments along with plan and map.	June 2011
7	Tax-based incentives, e.g. tax credits for land in PCAs/PAAs/PDAs	Participate in regional discussions	As scheduled
8	Defined measurable outcomes with ongoing monitoring and reporting and feedback loop	Annual Report to OLEC of actions taken - RAP assistance	June 2012

Notes

Item 2 – Wetlands, prioritized for importance to watershed plan goals, is included as an Appendix as part of the Plan report. These provide guidance to local communities for mitigation opportunities. Restoration Projects planned by Metroparks Serving Summit County and CVNP will be included in the suite of projects in order to facilitate eligibility for State incentives.

Item 3 – Forest priorities: RAP Cuyahoga ReLEAF project brochure is included in Appendices.

Major Issues to Manage
in the Furnace Run Watershed

1) Steep, fast draining, high-energy stream with limited potential for storm water storage in which upstream and headwater urbanization adds discharge volume and energy.

2) The stream is the leading sediment producer to the Cuyahoga River where erosion and sediment are negatively impacting park resources. TMDL cites sediment and nutrients as leading stressors to the Cuyahoga River.

3) Community goals to preserve rural / small town atmosphere and preserve / enhance vital Green space in Riparian Corridors while also promoting quality economic development.

4) Highly desirable communities of the watershed are under steady development proposals especially in headwater and upstream locations near highway interchanges.

5) Close proximately to highway network and mid-location between Akron and Cleveland provide market opportunities for office parks and related infrastructure.

6) Underused and newly vacant employment centers provide excellent opportunities for Priority Re-development Areas and exploration of State economic development incentives with respect for the watershed.

Furnace Run Watershed Planning Principles

1) Shared responsibility to protect the stream resource

2) Mutual respect for up- and downstream neighbors

3) Cultivation of a watershed-friendly community culture

4) Promotion of and rewarding for good behavior

5) Followup with preservation and restoration actions

Strategies for Continuity

1) The Furnace Run Watershed Planning Partnership will continue to meet and support implementation of the Balanced Growth Plan among its communities.

2) The Partnership will review any proposed amendments to the Plan and make recommendations to the governing bodies before changes may be made by any individual community.

3) The Partnership's decision making will be done on a consensus basis among all partners.

The Plan
INTRODUCTION

The Furnace Run 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 such as this 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.

Furnace Run and Cuyahoga River restoration

Cuyahoga River Community Planning Organization (CRCPO) is the non-profit fiscal parent for Cuyahoga River Remedial Action Plan and lead partner for the Cuyahoga - American Heritage River Initiative.

It is an ongoing strategic goal of CRCPO that the Cuyahoga River Remedial Action Plan (RAP) develop functional watershed partnerships and management plans for each of the tributaries which drain into the main stem of the Cuyahoga River Area of Concern.

Balanced Growth Watershed Planning

The Ohio Balanced Growth Program offers a way for watershed planning partnerships and the communities they represent to support watershed stewardship while allowing for development in appropriate places. Over the past eight years CRCPO has helped to sponsor the formation and growth of trib-based organizations for Big Creek, Mill Creek, Chippewa Creek, Brandywine Creek, and Yellow Creek. West Creek and Tinkers Creek have formed organizations as well. RAP also supports groups in Doan Brook and Euclid Creek; both are in the Area of Concern though draining directly to Lake Erie.

The Chippewa Creek model for Balanced Growth planning has been used and refined in our watershed plans for Big Creek and Brandywine Creek. The RAP has built an extensive library of watershed data and information that is available for use in the Furnace Run planning effort.

In the following Plan we will guide the reader through the planning process and provide the data, issues and outcomes of the work in Furnace Run, so as to offer a body of information and a roadmap toward watershed protection, restoration and stewardship.

Furnace Run

OHIO BALANCED GROWTH PROGRAM

"Linking Land Use Planning to the Health of Watersheds"

KEY BGP 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.

BGP LONG-TERM INTERESTS

- Sustaining and restoring natural systems in the Lake Erie basin.
- Encouraging the reuse and redevelopment 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 streamlined decision making
- Providing consistency and predictability for private and public development decisions

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.

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.

The Balanced Growth Program is both a response to this need and a framework around which can be built elements that will support watershed stewardship and land use management for the future:

• Communities setting priorities in a watershed context

• Whole-watershed collaborations on land use planning, and

• Consistency among ordinances and municipal operations.

GOALS of the FURNACE RUN BALANCED GROWTH PLAN

PCA

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

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.

- Establish a Furnace Run Watershed Planning (and management) Partnership (WPP), with appointment of members by Mayors or Township Trustees of the watershed communities.
- Develop shared understanding of stream function and best practices for watershed management based on CRCPO's Building Better Watersheds workshops and *The Watershed Book*.
- Assemble an inventory and assessment of the stream-related natural resource features of the watershed.
- Assemble and assess current community development patterns and related infrastructure in relation to critical stream features.
- Establish criteria and priorities for assessing and determining potential Priority Development Areas and Priority Conservation Areas:
  - Attenuate stream discharge
  - Preserve important riparian spaces
  - Focus development and redevelopment in areas which protect the stream
- Map the PCAs, PDAs and PAAs and reconcile any potential conflicts between development goals and stream stewardship.
- Develop implementation action plan and schedule for:
  - Improved local watershed based management practices for land development
  - Protection of specific PCAs though acquisition or easement
  - Promotion of defined PDAs and PAAs and close coordination with state resources.
- Adoption of Plan by the localities and submission to state for endorsement
- Continuing organizational support, and development of processes for amending plan, Partnership consultation and consensus decision making.

PAA

Priority Agricultural Areas

are locations where land use is currently agricultural in nature or where the soil or topography are such that agricultural activities may be the best and highest use of the land.

Furnace Run
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, such as flooding, that cannot effectively be addressed within the context of 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 (e.g. 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.

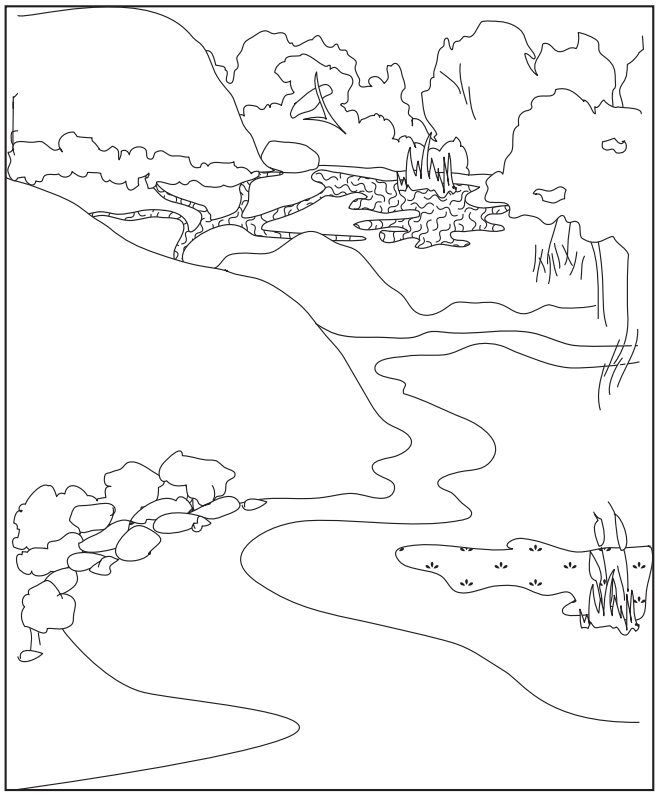
Watersheds function by:

- 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.

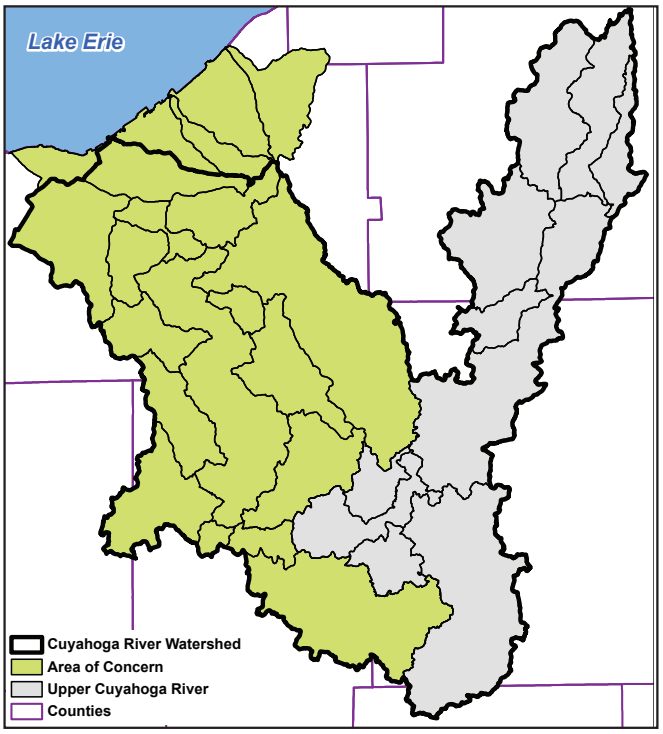


The Cuyahoga River basin drains 813 square miles and includes 1,220 stream miles spanning parts of Geauga, Medina, Portage, Summit and Cuyahoga counties, emptying into Lake Erie at Cleveland. The basin contains parts of three major physiographic provinces: the glaciated Allegheny Plateau, the till plains, and the lake plains. Most of the basin occurs in the glaciated Allegheny Plateau, and owes its topographic and hydrologic features to a complex glacial history. A small portion of the basin in southwest Cuyahoga County lies within the till plains, a relatively flat area more characteristic of north central and northwestern Ohio. The Cuyahoga River basin also cuts through the narrow border of the nearly level lake plains that surround Lake Erie and represents the ancient bottom of the predecessors to Lake Erie.

The Cuyahoga basin is situated within the Erie/Ontario Lake Plain (EOLP) ecoregion, a glacial plain that lies between the unglaciated Western Allegheny Plateau (WAP) ecoregion to the southeast and the relatively flat Eastern Corn Belt Plains (ECBP) ecoregion to the west and southwest. The EOLP ecoregion is characterized by glacial formations that can have a significant local relief of up to 300 feet and exhibits a mosaic of cropland, pasture, woodland, and urban areas.

Soils are mainly derived from glacial till and lacustrine deposits and tend to be light colored, acidic, and moderately to highly erodible. Many glacial features characteristic of the EOLP ecoregion are found in the Cuyahoga River basin. The northern and eastern boundaries of this v-shaped watershed are largely defined by the terminal moraines left by two fingers of glacial ice. Retreating glaciers then buried the ancient river valleys with glacial outwash. The headwaters originate in northeastern Geauga County and flow southwest to Akron through relatively hilly knob and kettle topography. The river generally follows the course of the buried valleys, but does traverse a ridge of erosion resistant sandstone, resulting in the falls and cascades of Cuyahoga Falls. The river turns sharply to the northwest at the confluence with the Little Cuyahoga River in north Akron, then winds through outwash terraces, till plains, and till ridges before reaching the flat lake plain of the Cleveland area.

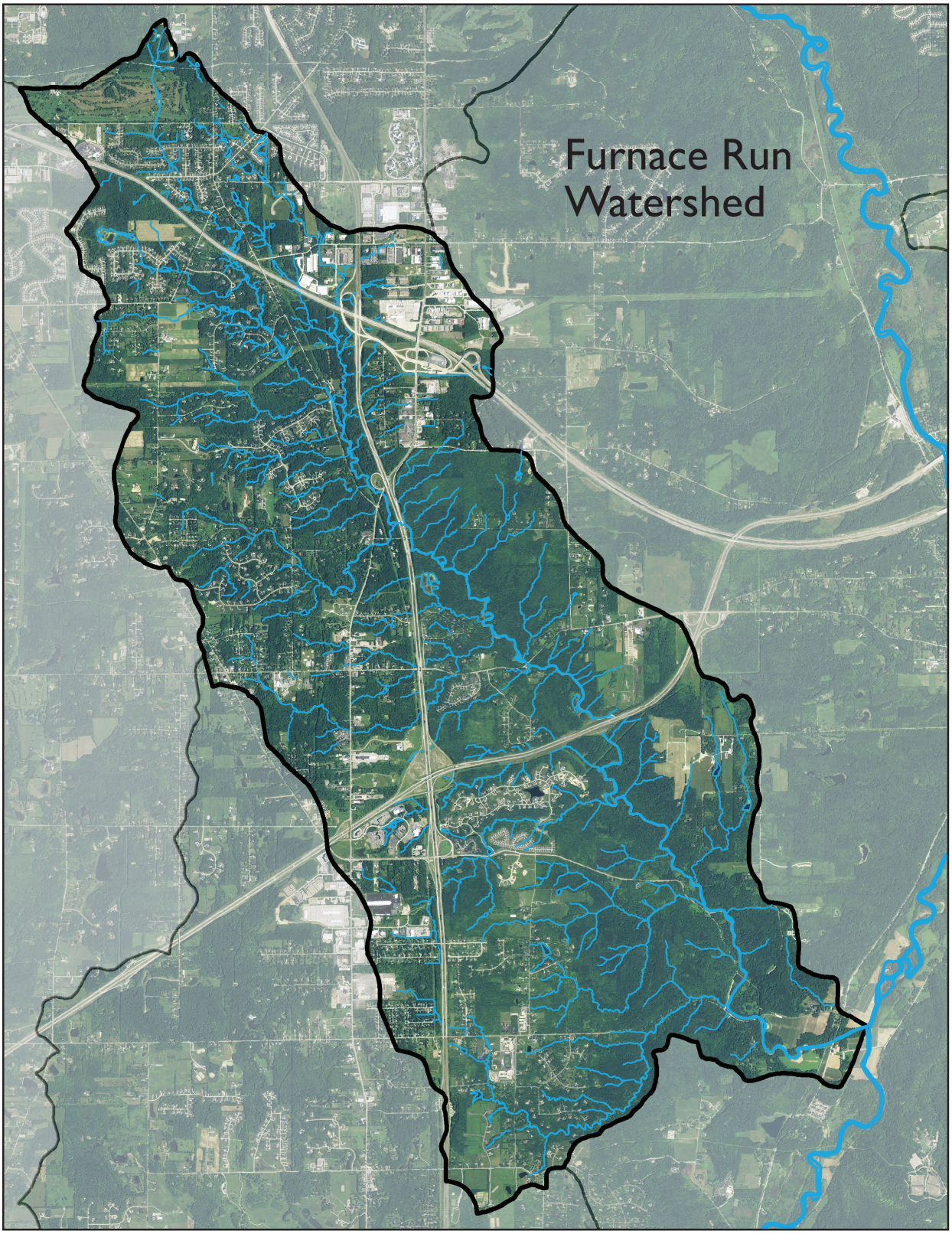
Land cover information from the 2003 Lower Cuyahoga TMDL report shows that approximately 36% of the watershed is covered by deciduous forest. 28% of the watershed is residential, 16% is pasture/hay/row crop agriculture, 11% is industrial/commercial/transportation, and 2% urban/recreational grasses. Slightly over 3% is determined to be woody or emergent herbaceous wetlands.



Land use patterns vary greatly, from the upper basin that is primarily agricultural to the lower basin which is among the most densely populated and industrialized urban areas in the state. Agriculture is the predominant land use in the upper basin, and while it is less prevalent in the middle basin, the soils there are highly erodible and can result in significant sedimentation and nutrient loadings. Resource extraction and hydromodification are localized throughout the basin. The waters of the heavily populated areas of the middle and lower basin are influenced by urban and construction site runoff, combined/sanitary sewer overflows, and land disposal.

Part of the upper Cuyahoga River is a designated State Scenic River and several stream segments within the basin have been designated as State Resource Waters. The Cuyahoga River, from the upstream edge of the Ohio Edison Dam pool to the mouth at Lake Erie and the nearshore area two miles west to ten miles east of the mouth, has been identified as an Area of Concern by the International Joint Commission. Twenty-two miles of the lower Cuyahoga River flow through the Cuyahoga Valley National Park. Additionally both the Cleveland Metroparks and Metro Parks, Serving Summit County have waterways contained in their respective holdings. The Cuyahoga River was designated an American Heritage River in 1998.

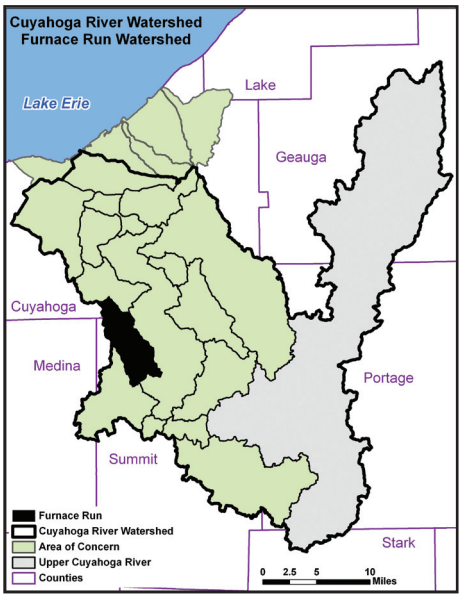
Furnace Run



Furnace Run originates in Brecksville, Broadview Heights and Richfield Village and Township in southern Cuyahoga and northern Summit counties in northeast Ohio.

Flowing approximately 10.4 miles southeast through Richfield, Bath and Boston Townships, it joins the Cuyahoga River at river mile (RM) 33.08 in the Cuyahoga Valley National Park.

The watershed drains approximately 20.34 square miles of predominately suburban lands. 2002 satellite land cover analysis determined that approximately 14 % of the watershed is considered urbanized with generally impervious surfaces. The remaining 86 % of the watershed is comprised primarily of wooded (47%), grass/agricultural (34%) shrub/scrub (7%) (Cuyahoga River RAP-2002)



Furnace Run enters the Cuyahoga River at mile 33.08, in the Cuyahoga Valley National Park.

Drainage area: 20.34 Sq miles

Hydrologic Unit Code: HUC-14 04110002-040-050

Main stem Length: 10.4 miles

Gradient: From 1252 ft to 69 ft, dropping 561 feet: average fall of 54 feet per mile.

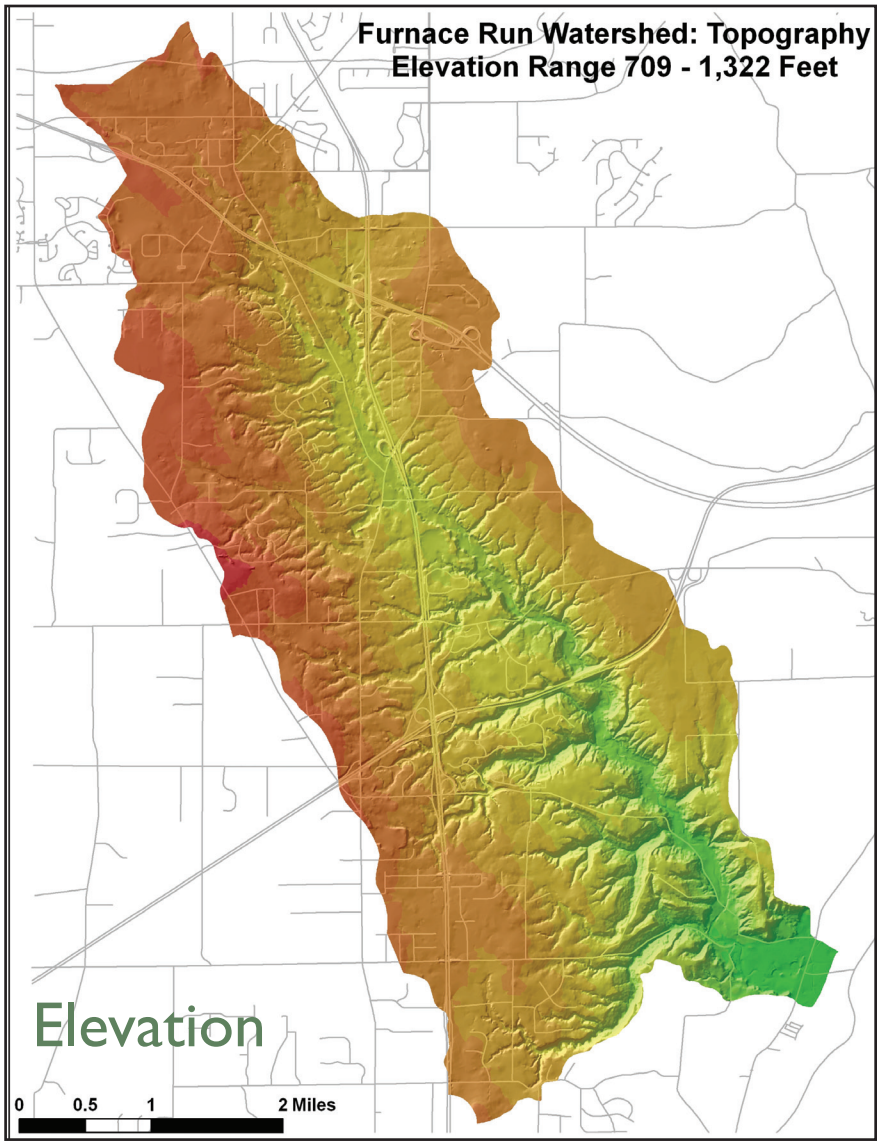
Water quality - meets OEPA water quality standards, but threatened.

Special Park Features

Furnace Run Metro Park, totaling 870 acres on seven tracts located in Richfield Township and Richfield Village, is operated by Metro Parks, Serving Summit County. The tracts are fragmented east-west by Interstate 77, State Route (SR) 21, and Brecksville Road, and north-south by Brush Road and State Route 303; however, two of the southernmost tracts, approximating 43 acres along Wheatley Road, are disjoined from the remainder of the park and ecologically separated by Interstate 271.

The Cuyahoga Valley National Park (CVNP) which contains 30,000 acres of wetland and forest along the Cuyahoga River from Akron to Cleveland also has property within the Furnace Run Watershed. Furnace Run Metro Park is adjacent to Cuyahoga Valley National Park. Because of the enormous appeal of these parks there is increasing pressure on the watershed and downstream park assets resulting from adjacent urbanization.

The Cleveland Metroparks system has recently taken over management of the property that contains the northernmost section of the watershed, where they intend to naturalize 500 acres in and around a golf course.



Furnace Run
Aquatic Life and Habitat

The water quality and the health of aquatic life in Furnace Run are useful indicators 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 (e.g. building in flood zones or riparian corridors) and the design of the development (e.g. development that creates large amounts of impervious cover and stormwater runoff).

Furnace Run is one of the healthiest, mostly intact, streams that flow into the Cuyahoga River. Previous work in Furnace Run (1991-1996) indicated that this watershed is in full attainment of biological and water quality standards, meeting Ohio EPA standards. Some sites within Furnace Run exceeded Ohio EPA standards and were noted as "Exceptional Warm Water Habitat (EWH)".

Effects from urbanization in the vicinity of the turnpike interchange and I-271 interchange with I-77 and Wheatley Road are principal stressors to the long term quality of Furnace Run.

HYDROLOGY IN FURNACE RUN WATERSHED

Significant bank erosion is occurring in lower Furnace Run based on visual observations of banks at sampling sites along with excessive amounts of silts/clays covering the stream bottom. The stream bottom at RM 4.8 has been covered with gray silts which clearly appeared to have eroded from the stream banks. This can be attributed to heavy rains and runoff from new and old development that lack proper storm water attenuation controls.

The long narrow shape of the drainage basin, coupled with its rather steep and direct route downstream causes Furnace Run to develop high-energy discharge. COE Sediment Transport model confirmed earlier studies that cited Furnace Run as the single largest contributor of sediment into the main stem of the Cuyahoga River.

Management and attenuation of the high-energy, erosion-producing stream flow is an important goal for the BGP Watershed Management Plan.

USE-ATTAINMENT IN FURNACE RUN

The results of the aquatic life and habitat evaluations indicate that this watershed is in PARTIAL attainment. A study conducted in 2003 by Metroparks Serving Summit County found that Rock Creek, a tributary of Furnace Run, was in non-attainment. Although the stream habitat was in good enough condition to support higher level aquatic life communities and meet Ohio EPA standards, it was not in attainment. This was attributed to upstream runoff from slag leachate, during and immediately following construction of the Interstate 80 interchange near this area in 2000-2001, along with some channelized stream conditions immediately downstream.

Although the fish communities in both Rock Creek and Furnace Run meet EPA criteria, the aquatic insect community shows of impairment. However, aquatic life has improved in Rock Creek from 2003 to 2006. This indicates that this small tributary is improving or adjusting to the impacts from the slag leachate discharge although water chemistry results indicate that these impacts are not diminishing with time.

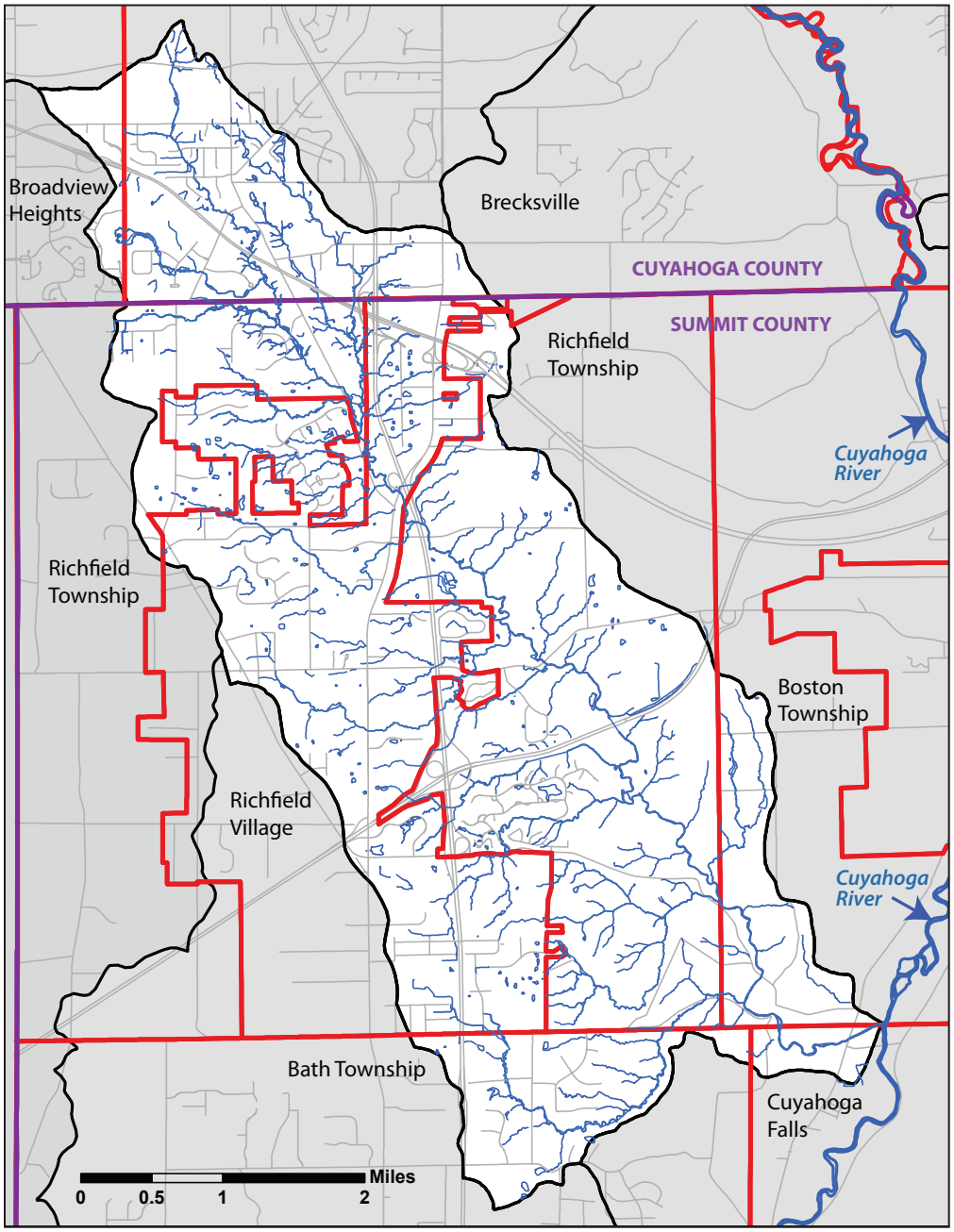
The stream restoration area in the Furnace Run main stem (RM 7.8) was completed in 1999. This project consisted of returning Furnace Run to its original watercourse after previously being diverted to Brushwood Lake. Restoration of this stream segment consisted of soil bioengineering techniques to improve riparian habitat. The 2003 survey conducted by Metro Parks, Serving Summit County found this area to be in partial attainment with Ohio water quality standards for aquatic life, while the 2006 survey found the area to be in full attainment.

This indicates that the restoration project has been a success in this stream segment and that the stream is susceptible to other similar watershed improvement measures.

WATER QUALITY IN FURNACE RUN WATERSHED

Furnace Run has good water quality with recent data showing no exceedence of OEPA standards. Rock Creek's water quality is showing signs of stress. Samples indicate the stream is receiving polluted runoff, as evidenced in elevated dissolved solids. This decrease in water quality is most likely a result of the slag leachate runoff from the Ohio Turnpike interchange construction upstream. As noted before, continuing urbanization in the vicinity of the interchanges is a principal stressor to the stream flow and its downstream effects.

Political Boundaries



The Furnace Run communities have a history of promoting regional collaboration and cooperation. Brecksville and Broadview Heights were both active supporters and participants in the Chippewa Creek Balanced Growth Watershed Management Plan. Mayor Mike Lyons of the Village of Richfield serves on the CRCPO Board, has been an active leader in a number of regional collaboration initiatives and fully acknowledges the need and value of a plan to protect and preserve key elements of Furnace Run.

The Furnace Run Partnership was formally organized for the purpose of participating in the development of the BGP Watershed Management Plan. The Communities are currently active in watershed stewardship and embrace shared goals for the watershed.

The seven general-purpose units of local government in the watershed agreed to participate. Village of Richfield Mayor Lyons led the planning partnership in the effort, with assistance from CRCPO. Approval from 75% of the watershed land area, and number of communities and population is required in order to receive State endorsement.

Communities in Furnace Run Watershed	Municipal Composition (% of Watershed)	Population in Watershed (2008)
Richfield Township	45.4	2,880
Village of Richfield	25.3	2,104
City of Brecksville	13.1	1,828
Bath Township	7.1	626
Boston Township	6.0	88
City of Broadview Heights	1.7	405
City of Cuyahoga Falls	1.4	552
Total	**100**	**8,483**

* The parts of Boston Township and Cuyahoga Falls in the Furnace Run watershed lie wholly within the Cuyahoga Valley National Park.

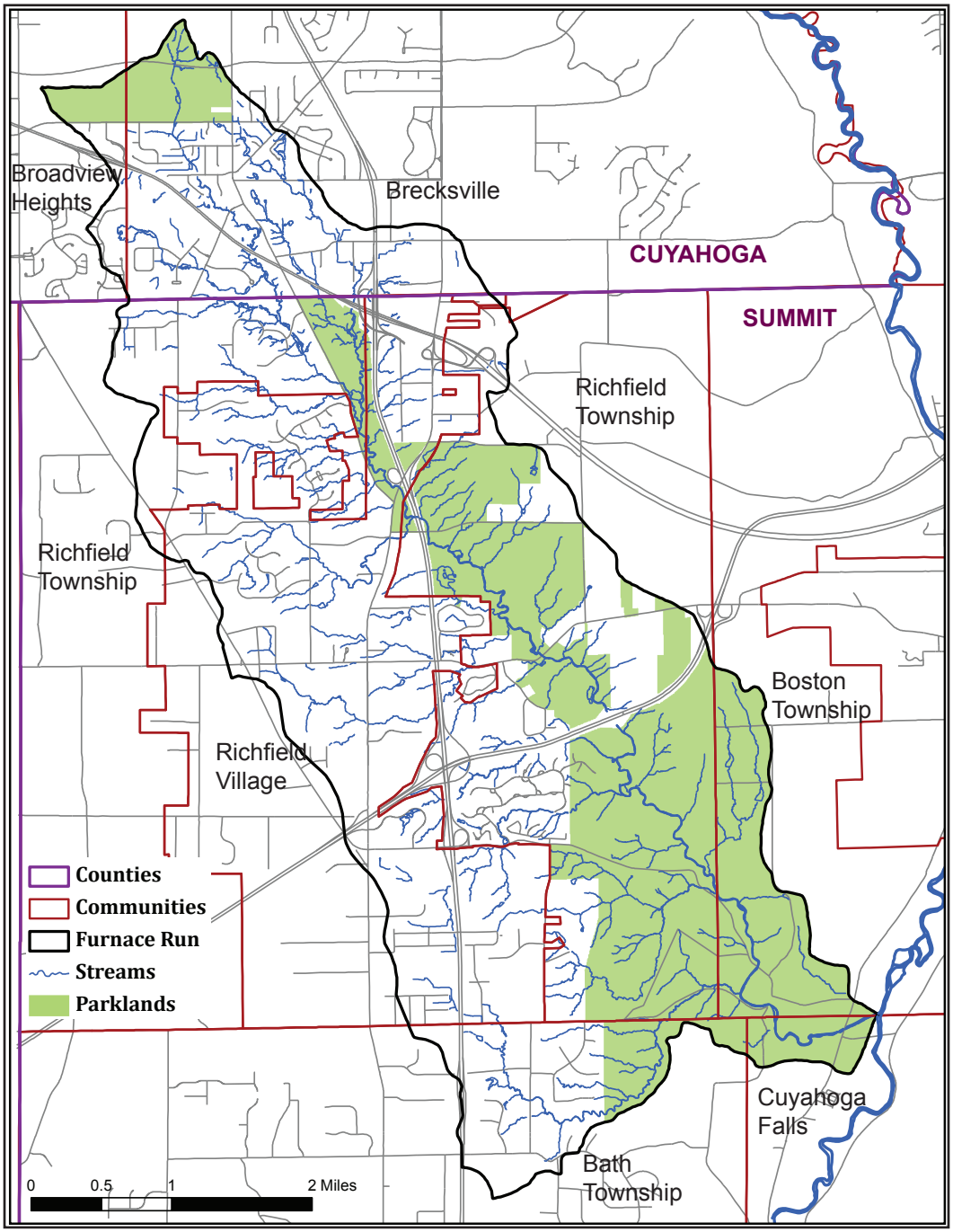
Furnace Run Parklands

The quality of Furnace Run and its watershed is supported in large part by the fact that approximately a third of the land is situated in one of three major park systems:

The northernmost headwaters lie in a portion of land under management by the Cleveland Metroparks. Five hundred acres in and around a golf course property will be naturalized, a significant portion of which is in the Furnace Run watershed.

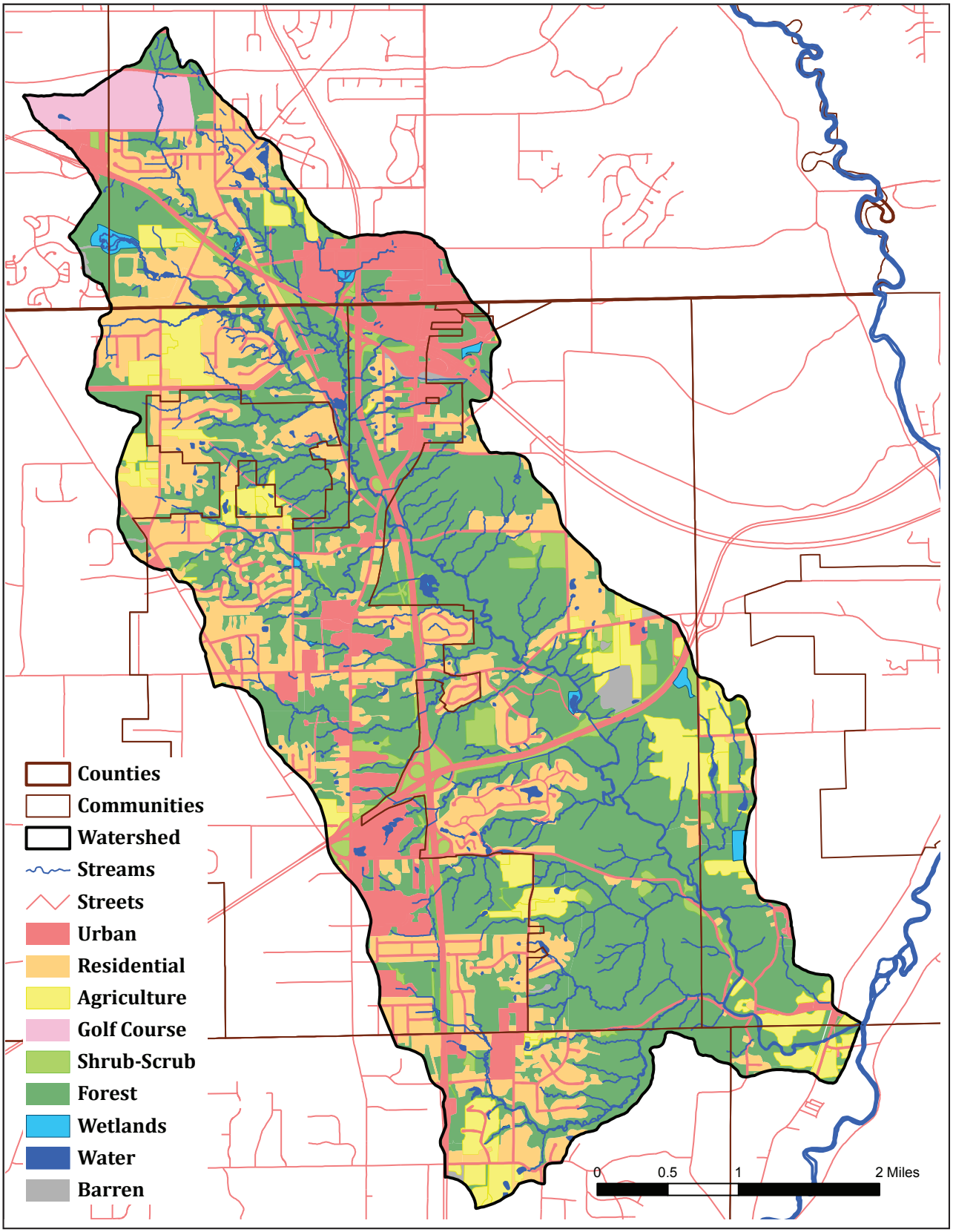
Beginning at the Summit County line and running south, Metro Parks, Serving Summit County manages the 890-acre Furnace Run Metro Park, including areas of land in Richfield Township and Village north of Interstate 271, and 43 acres south of the freeway. The southern section is adjacent to the Cuyahoga Valley National Park.

Cuyahoga Valley National Park owns properties that lie at the southeast edge of the watershed, within Boston Township, which is itself wholly within the park.



Total Acres in Watershed	Acres in Parklands	Percent of Watershed in Parklands
13,118.2	4,171.7	31.8

The map below shows the various characteristics of land cover and uses in the Furnace Run Watershed.



Furnace Run
Planning Partnership Governance and Organization

The development of the Furnace Run Balanced Growth Plan began with the convening of a group of community representatives – elected and appointed officials from each of the seven units of government, as well as the park systems with land in the watershed.

Representation: The Chief Executive (Mayor or Chair of Trustees) of each community appointed community representatives to participate in the Watershed Planning Partnership (WPP), the number of participants being based on the criteria shown in the accompanying table, plus alternates. The criteria for weighting representation were designed to recognize the form of government and each community's percentage of the entire watershed's population. Incorporated cities and villages received additional representation, and those with larger percentages of the watershed population had proportionally more representatives on the WPP.

Park districts in the watershed each were asked to appoint two associate members, whose participation would be included in the WPP proceedings but whose vote would not count toward the 75% approval level needed for final Plan Endorsement by Ohio Lake Erie Commission.

The expectation made clear to WPP members was that they would:

- Attend consistently
- Be properly informed
- Support measures that promote responsible watershed stewardship while also accommodating the need and plans for continued community economic development
- Provide feedback and set priorities for the watershed to define Priority Conservation Areas, Priority Development/Redevelopment Areas and Priority Agricultural Areas, based on a suite of mutually agreed evaluation criteria
- Report to their respective communities regarding the planning process
- Seek endorsement of the plan by their respective communities, as it had been endorsed by the WPP

CRCPO's Executive Director served as Project Coordinator. In this capacity, he:

- Facilitated the WPP Meetings, though not participating in consensus decisions of the WPP members
- Prepared plan materials and managed the production of reference data and maps for use by the WPP as funded by OLEC for the Plan development, and currently
- Coordinates the approval process with local governments and State of Ohio

Training and Meeting: The Partnership met regularly in approximately ten meetings for the duration of the Watershed Plan development process, plus attended additional public presentations as needed. The sessions were held at the Village of Richfield administrative offices, led by Village Mayor Michael Lyons and facilitated by CRCPO staff.

The sequence of WPP plan meetings was thus:

1. Members were instructed about watershed function in general by CRCPO staff
2. Members were informed of Furnace Run-specific land use, natural resources, community land use plans and wate shed management issues, with CRCPO providing data and community members providing input
3. Members selected criteria, priorities and general decision-making processes through consensus and with respect for differing views

Decisionmaking and technical advisory assistance:

Technical advisors were identified to provide support to the WPP, but did not take part in the consensus decisions. They, and their areas of support included:

Summit County Engineer - NPDES Phase II Coordinators

Summit County Soil and Water - Model codes

Summit County Board of Health - Home treatment system issues

Summit County Planning - Planning and Demographic Data

NEFCO - 208 Plans

Ohio EPA- RAP Delisting, TMDL and NPDES Phase II Support

WPP Representation for the General Purpose Units of Government and the Park Districts was allocated according the following Criteria:

WPP Representation Criteria	# of Reps
Cities & Villages / Park Districts	2
Townships	1
Plus additional Reps for the General Purpose Units based on % of Watershed Land:	
1-5%	1
6-15%	2
16-30%	3
> 30 %	4

Community	Comments	% of the Watershed	City/Village - 2 Township - 1 Park Dist - 2	% of WS occupancy	TOTAL
City of Brecksville	Member of Chippewa BGI WPP, Mayor serves on National Park's Advisory Board	**13.1 %**	2	2	**4**
City of Broadview Heights	Member of Chippewa BGI Watershed Planning Partnership	**1.7 %**	2	1	**3**
Village of Richfield	Mayor Mike Lyons, Member CRCPO Board of Directors and RAP Committee. Chairman of Cuyahoga Valley Regional Council of Governments. Leader in new efforts at regional collaborations & cooperation	**25.3%**	2	3	**5**
Richfield Township	Maintains close working relationship with Village of Richfield	**45.4%**	1	4	**5**
Bath Township	Leader in Yellow Creek Watershed Plan. Sponsor for Friends of Yellow Creek	**7.1%**	1	2	**3**
Boston Township	Watershed territory is wholly within Cuyahoga Valley National Park	**6.0%**	1	2	**3**
City of Cuyahoga Falls	Watershed territory is wholly within Cuyahoga Valley National Park Participant in the Yellow Creek Watershed Partnership	**1.4%**	2	1	**3**
Park WPP Associate members:					
Metro Parks, Serving Summit County	Participates on the RAP Coordinating Committee		2		2
Cuyahoga Valley National Park	Participates on the RAP Coordinating Committee, Participated in Chippewa Creek BGI plan and helped organize the partnership for the Brandywine BGI Plan.		2		2
	TOTAL WPP				30

Major Issues to Manage in the Furnace Run Watershed

1) Steep, fast-draining, high-energy stream with limited potential for storm water storage in which upstream and headwater urbanization adds discharge volume and energy

2) The stream is the leading sediment producer to the Cuyahoga River where erosion and sediment are negatively impacting park resources. TMDL cites sediment and nutrients as leading stressors to the Cuyahoga River.

3) Community goals to preserve rural / small town atmosphere and preserve / enhance vital Green space in riparian corridors while also promoting quality economic development

4) Highly desirable communities of the watershed are under steady development pressure especially in headwater and upstream locations near highway interchanges

5) Close proximately to highway network and mid-location between Akron and Cleveland provide market opportunities for office parks and related infrastructure

6) Underused and newly vacant employment centers provide excellent opportunities for Priority Re-development Areas and exploration of State economic development incentives with respect for the watershed.

Furnace Run Watershed Planning Principles

1) Shared responsibility to protect the stream resource

2) Mutual respect for up- and downstream neighbors

3) Cultivation of a watershed-friendly community culture

4) Promotion of and reward for good behavior

5) Followup with preservation and restoration actions

Strategies for Continuity

1) The Furnace Run Watershed Planning Partnership will continue to meet and support implementation of the Balanced Growth Plan among its communities.

2) The Partnership will review any proposed amendments to the Plan and make recommendations to the governing bodies before changes may be made by any individual community.

3) The Partnership will make decisions on a consensus basis.

Critical Watershed Features and Functions

Watersheds are complex systems in which biological, physical and chemical processes interact. Streams react to changes in the watershed and work to keep the system in a state of equilibrium.

Streams do more than move water from one place to another. They change their shape and spread by moving sediment from one place to another. They increase their holding capacity by creating looping meanders to lengthen themselves, or spread over their banks to slow their flow, or reduce capacity and increase flow if necessary.

Streams and the land around them support wildlife habitat. Changes in the surrounding watershed spur compensatory changes in streams, which in turn cause changes in the habitat, and therefore in the wildlife that depends on it.

The elements of the watershed system are interdependent.

Wetlands serve as storage and filtration facilities, placed where they need to be, and hosting the type of flora needed in that place, to keep the system in balance.

Soils have different characteristics based on whether they are needed to drain stormwater quickly down into the soil, hold water, or send rain running across the surface.

Slopes have different profiles. Steep ones are more easily eroded, shallow ones more readily retain new deposits.

To measure the health and functionality of a given watershed, the features are analyzed. As changes are made to the watershed's surface or shape, those changes are measured.

The watershed features and their effect on the watershed's function are the bases for finding and restoring a watershed to equilibrium and to optimal function.

The watershed features critical to healthy function of Furnace Run include:

- Wetlands
- Riparian areas
- Floodplains
- Headwater streams
- Steep slopes
- Critical soils
- Forest cover

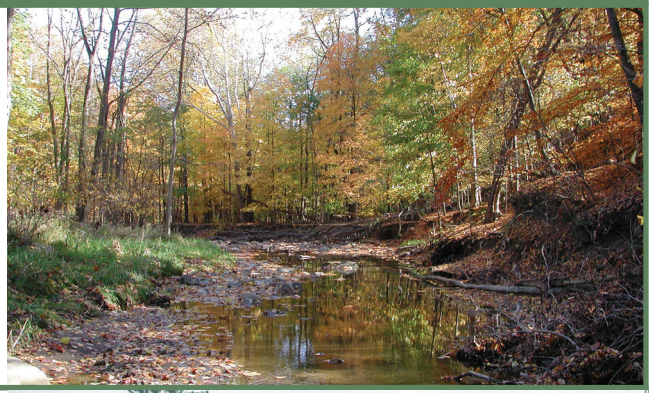
Furnace Run

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 AREAS 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 plan 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.

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 the whole organism depends upon a functioning capillary system, the health of larger streams and rivers depends 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 affected the most during development and need protection.

Watershed Features

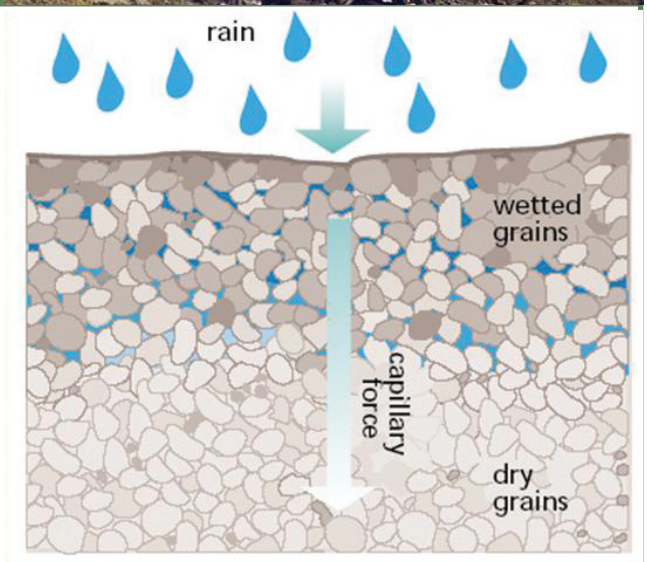
STEEP SLOPES are features of stream valleys and need to be protecterd. Any significant disturbance to the hillside's environment may result in landslides or land instability, alteration in drainage patterns; and loss of scenic value. When development takes place on or near steep slopes (15% or greater), vegetative cover is greatly reduced, significantly increasing soil instability and erosion. Soil erosion and sedimentation into waterways pose 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.

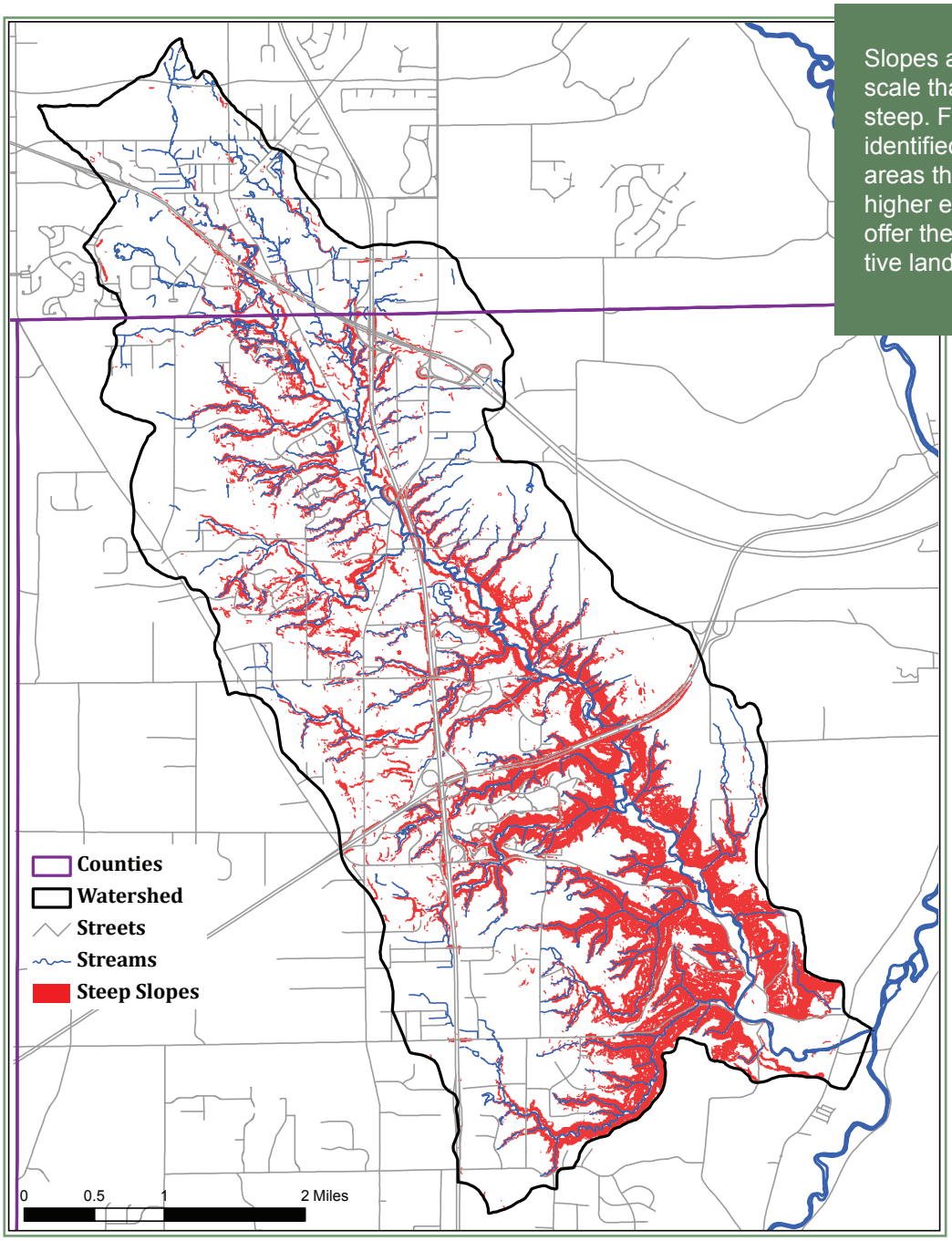
Communities need to develop forest cover programs that help maintain and restore tree cover to beneficial levels.

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.

Furnace Run
Watershed Feature: Steep Slopes



Slopes are mapped using a scale that ranges from flat to steep. For our analysis, we identified the steeply sloped areas that could contribute to higher erosion potential and offer the most value for sensitive lands and habitat.

Slopes with a grade of 12% 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.

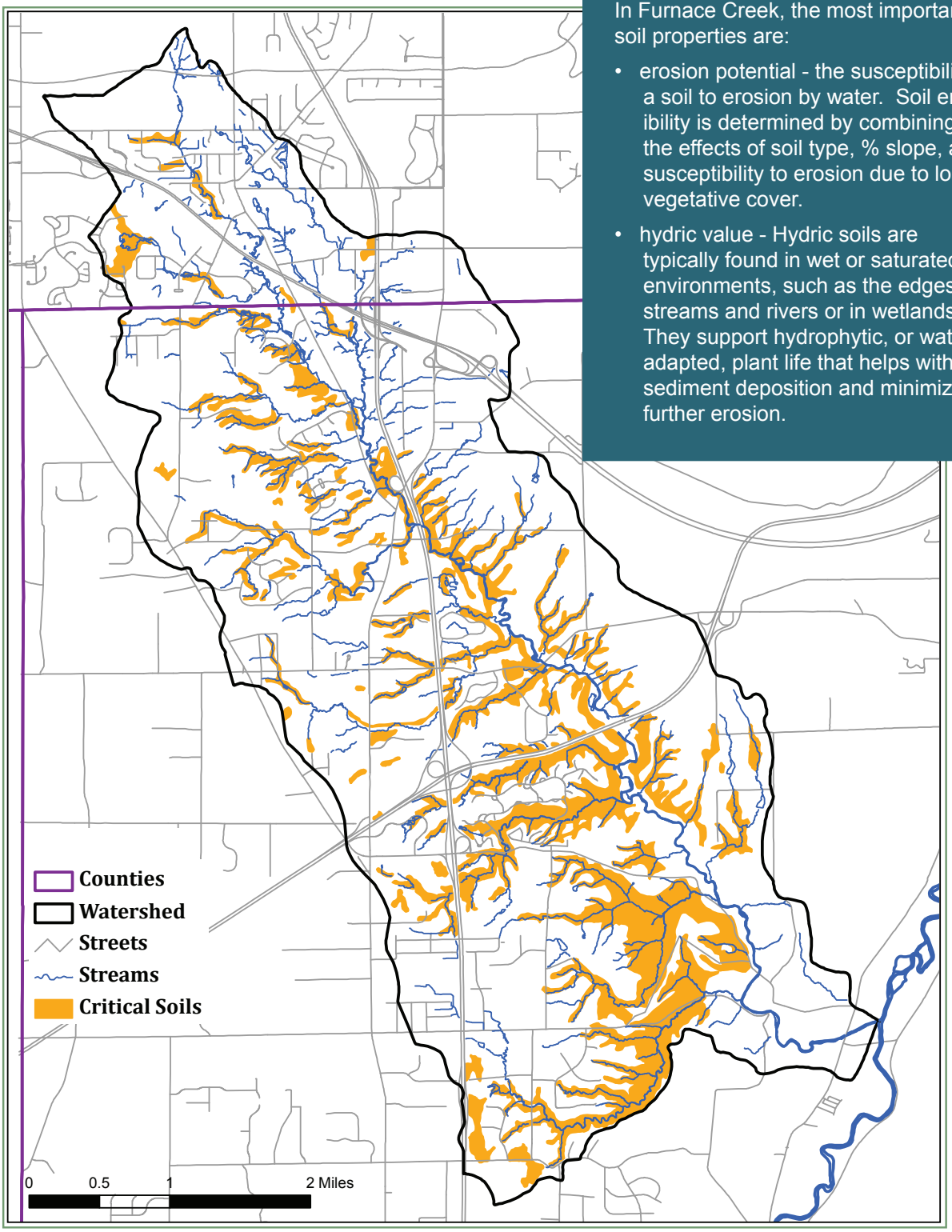
Steep slopes with grades of 12% or more were selected. The need to protect these slopes is based on A.) percent and length of slope, B.) whether soils are erodible, and C.) other important natural resources (e.g. streams and wetlands) in close proximity.

Watershed Feature: Critical Soils

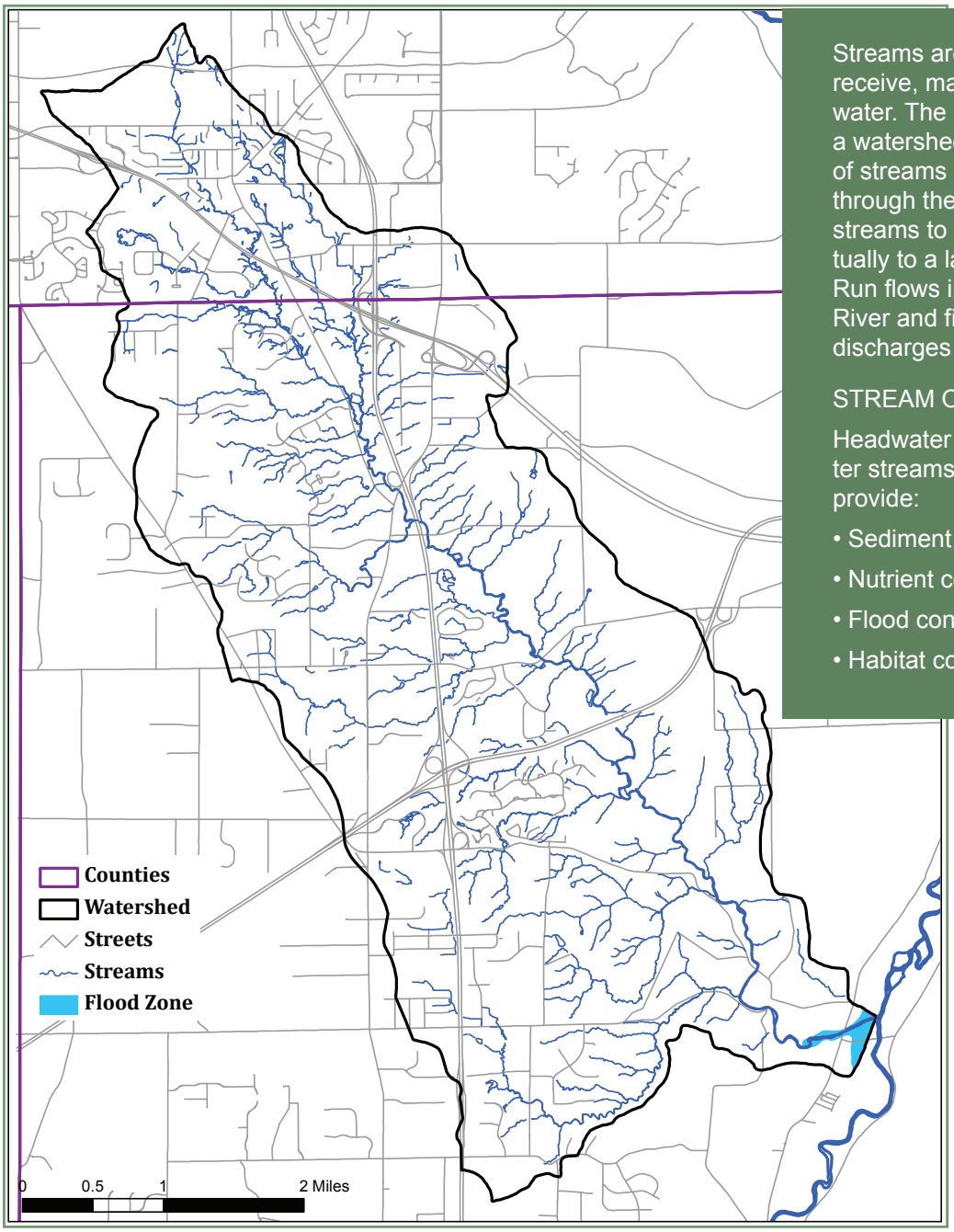
The composition and characteristics of soils are important for their impacts on water quality.

In Furnace Creek, the most important soil properties are:

- erosion potential - 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.
- hydric value - Hydric soils 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.



Furnace Run
Watershed Feature: Streams and Flood Plains



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 Furnace Run flows into the Cuyahoga River and finally reaches and discharges into Lake Erie.

STREAM ORDER

Headwater and primary headwater streams provide:

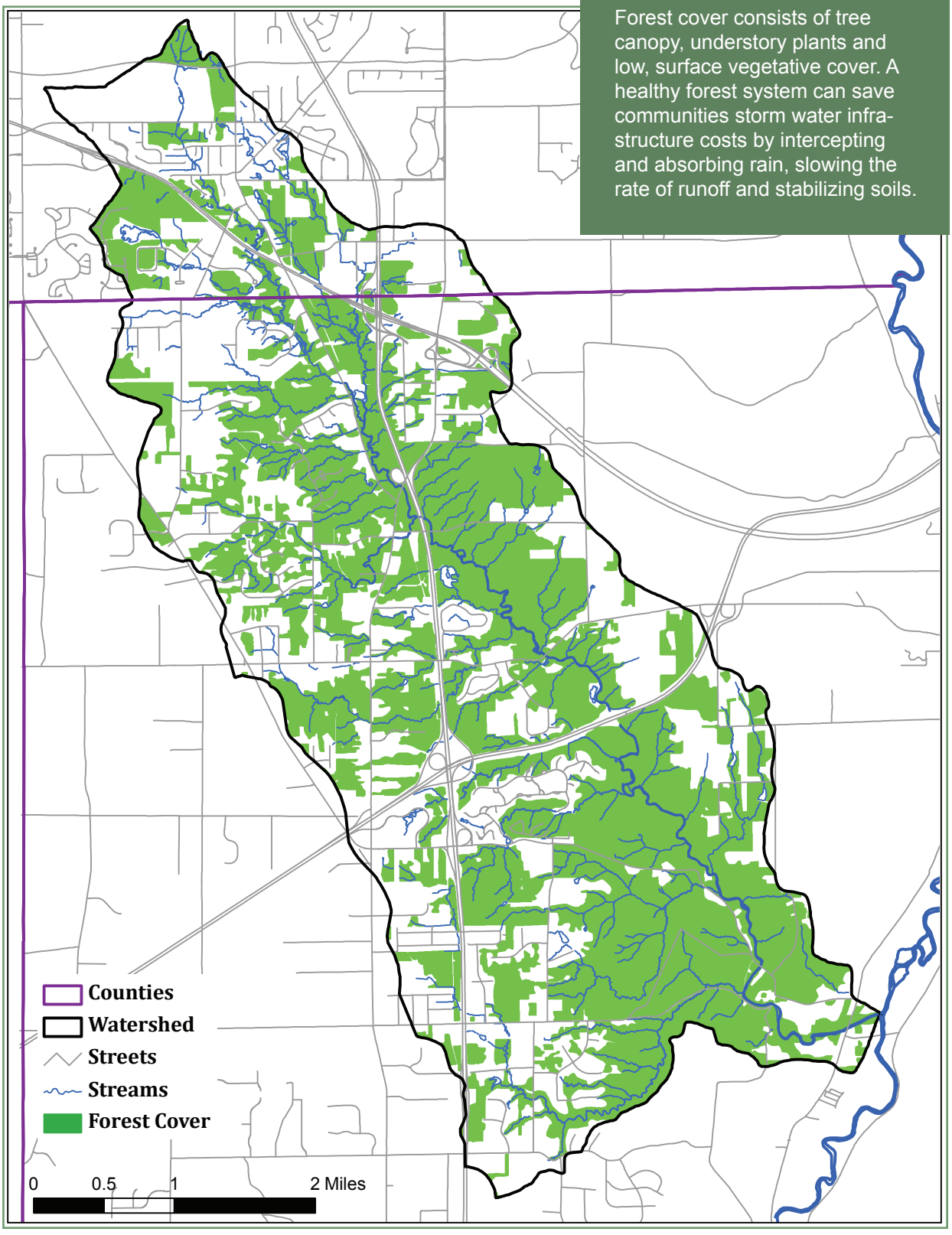
- Sediment control
- Nutrient control
- Flood control
- Habitat corridors

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. Big 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 Headwater Streams - Streams that drain a watershed less than one square 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.

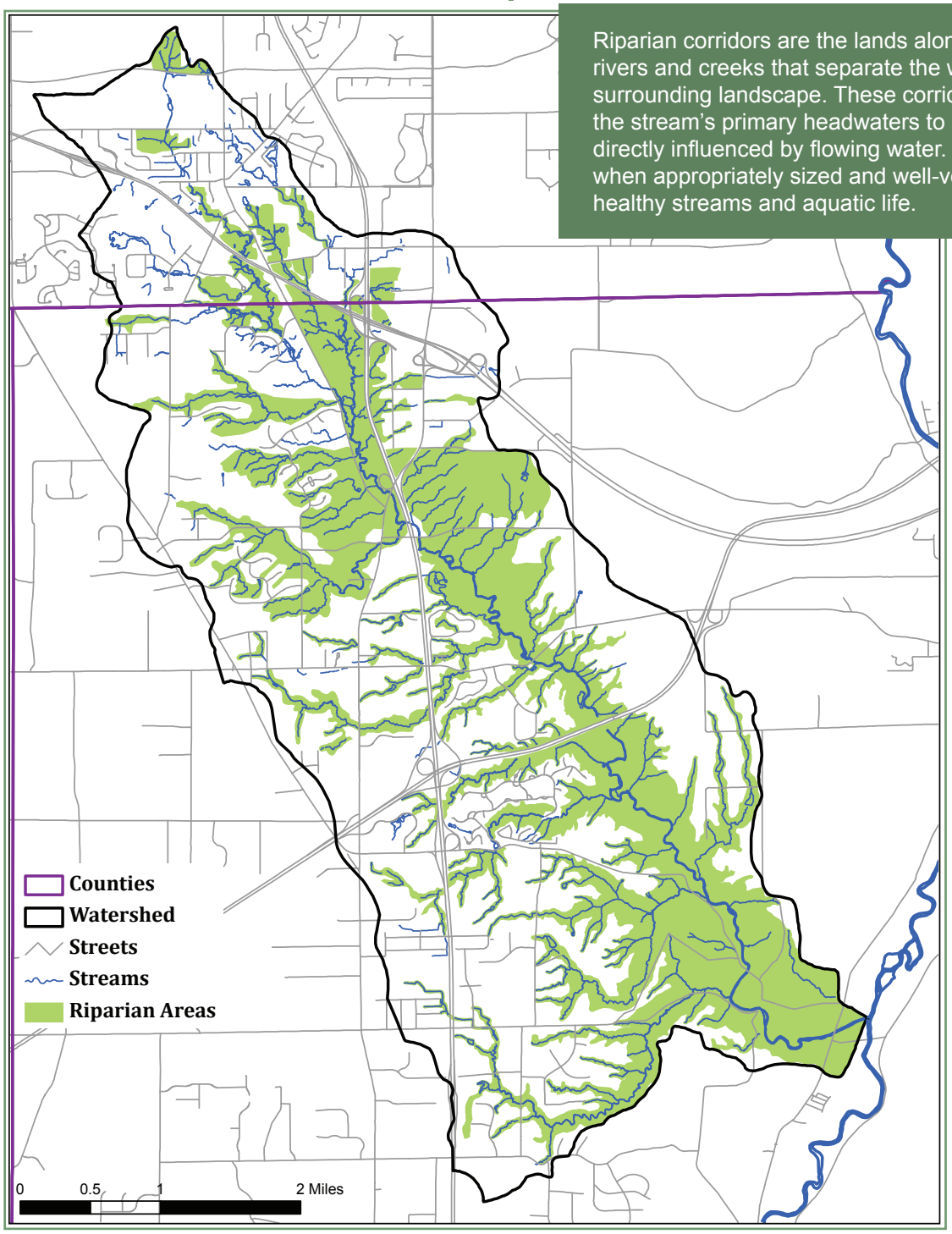
Watershed Feature: Forest Cover

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.



Furnace Run
Watershed Feature: Riparian Areas

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.

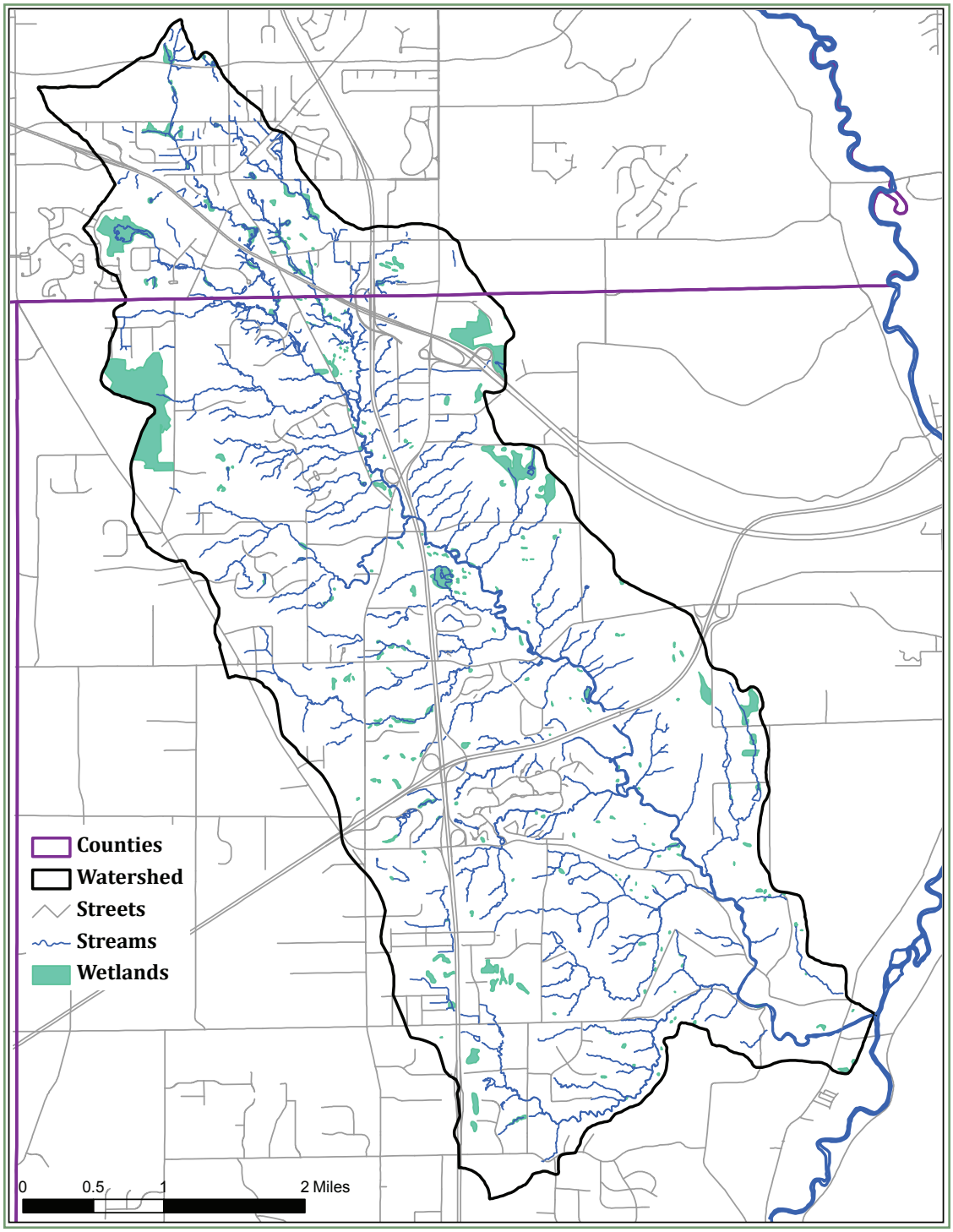


For the riparian corridor analysis, stream drainage areas of 0.5-20 sq. miles and <0.5 sq. miles were incorporated to determine riparian width. Recommended riparian corridor setback distances are based on the analysis of scientific studies that indicate the minimum setbacks required to maintain the functioning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

Watershed 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 storage of flood waters. Wetlands filter out contaminants and sediment in stormwater runoff, while also providing shelter and breeding habitat for many organisms.

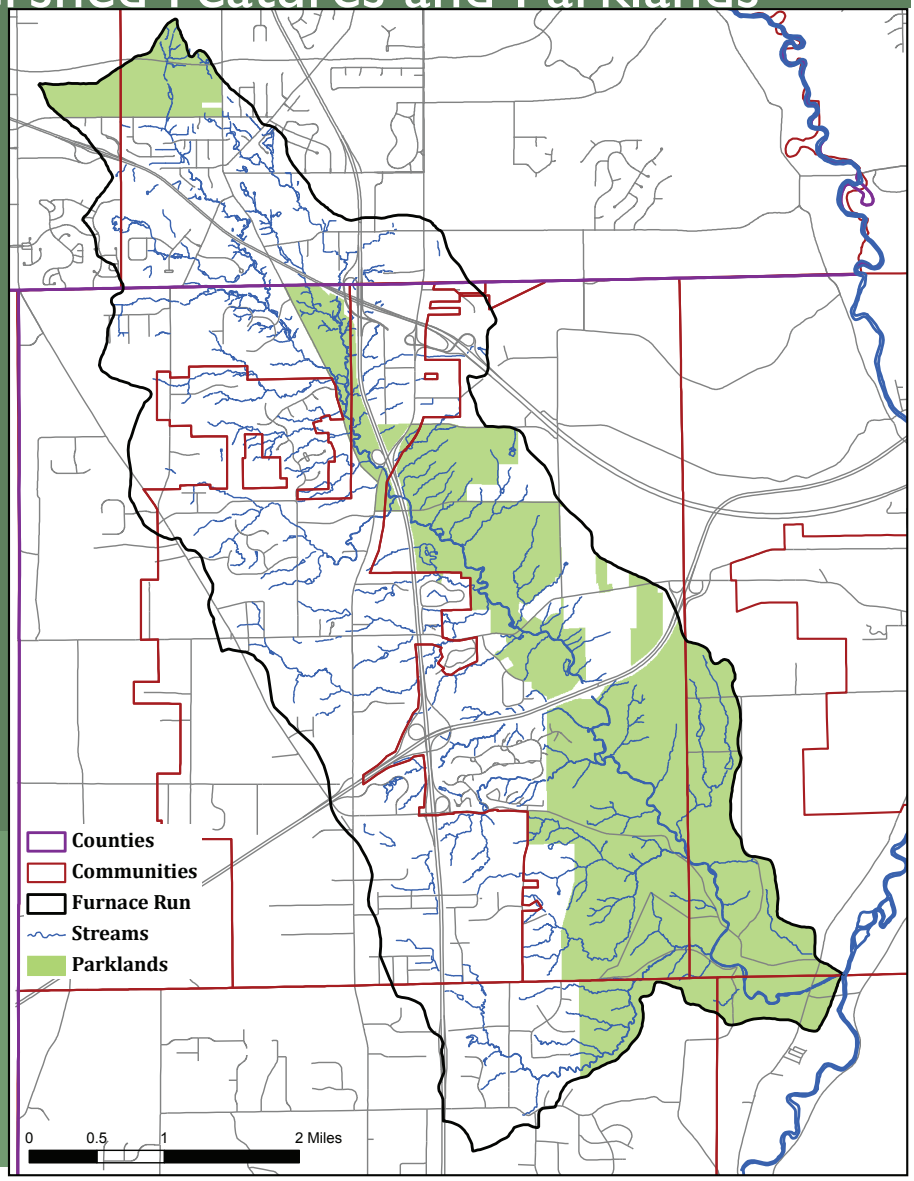
As discussed in more detail in the "Tools for Watershed Stewardship," wetlands require a setback or buffer zone (75 ft. or 120 ft.,) based on the overall quality of the wetland. For the purposes of this project we placed a 75 ft. setback on all identified wetlands.

Furnace Run Watershed Features and Parklands

Much of the Furnace Run watershed, almost 32%, lies within park boundaries – primarily in the Furnace Run Metro Park of Metro Parks, Serving Summit County and in the Cuyahoga Valley National Park.

These areas are higher functioning due to their relative wildness and better protected by virtue of their hosts' missions. On the other hand, as landowners downstream of private property owners, they are often, to their detriment, at the mercy of upstream decisions.

The table below shows the amount of the five most important features vis a vis their location in or out of park boundaries.

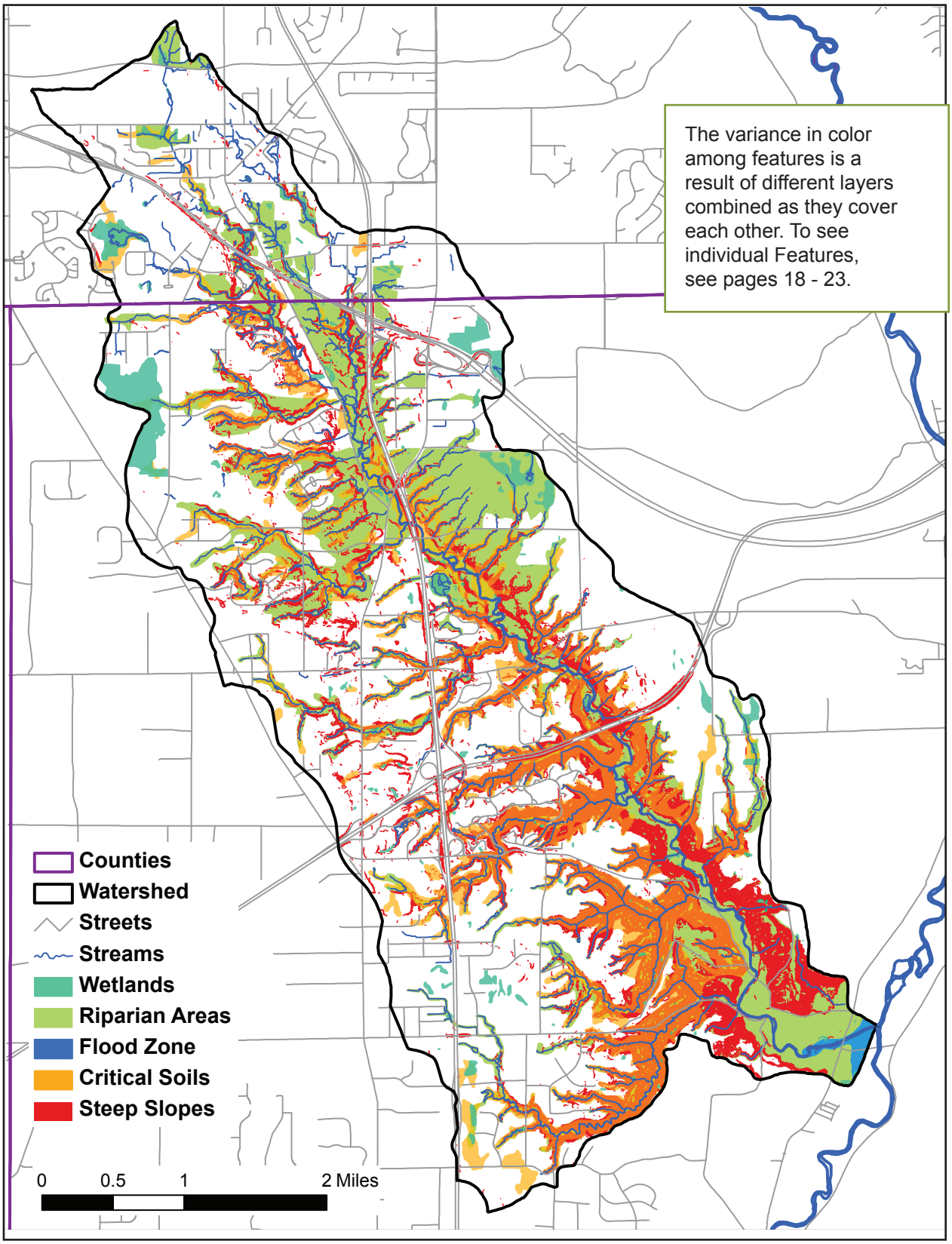


Location of critical features relative to Parkland / Non-Parkland control and stewardship

Attribute	Total Acres in Watershed	Percent of Watershed	Acres in Parklands	Percent of Watershed Total in Parklands	Non-Park Acres	Percent of CNF in Non-Park Acres
Watershed Total	13118.2	100.0	4171.7	31.8	8946.5	68.2
Wetlands	364.3	2.8	86.9	23.9	277.4	76.1
Wetland Buffers	1176.2	9.0	578.8	49.2	597.4	50.8
Riparian Setbacks	1048.3	8.0	460.8	44.0	587.5	56.0
Riparian Areas	4578.8	34.9	2728.7	59.6	1850.0	40.4
Forest	6340.9	48.3	3143.5	49.6	3197.4	50.4
Critical Soils	2030.0	15.5	1536.8	75.7	493.2	24.3
Steep Slopes	2710.8	20.7	1490.6	55.0	1220.2	45.0

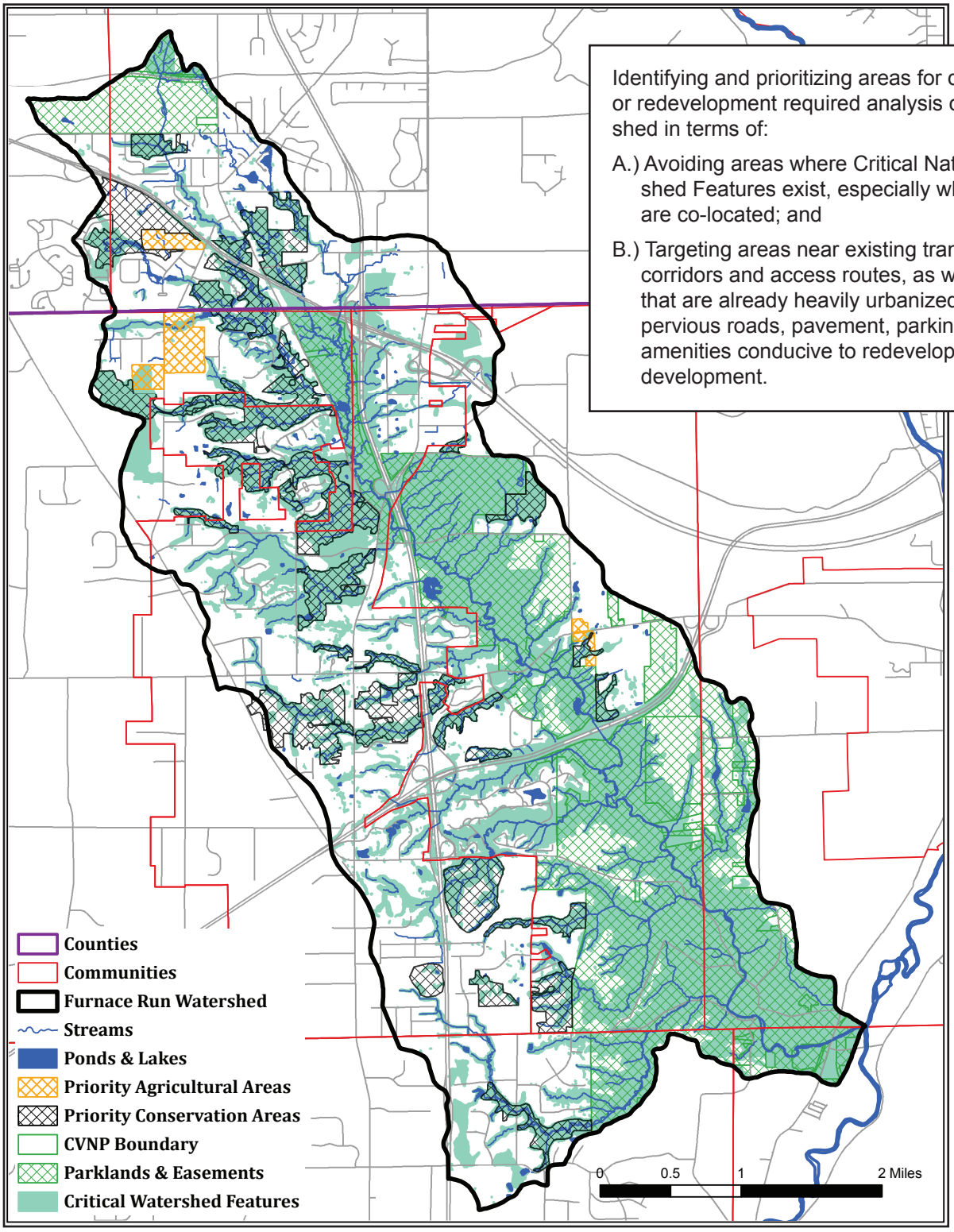
Composite of Critical Watershed Features

The composite map embodies all the critical natural features “layered-up” in the Furnace Run Watershed. This map represents the values the watershed partnership expressed and the necessary functional aspect of the Furnace Run Watershed.

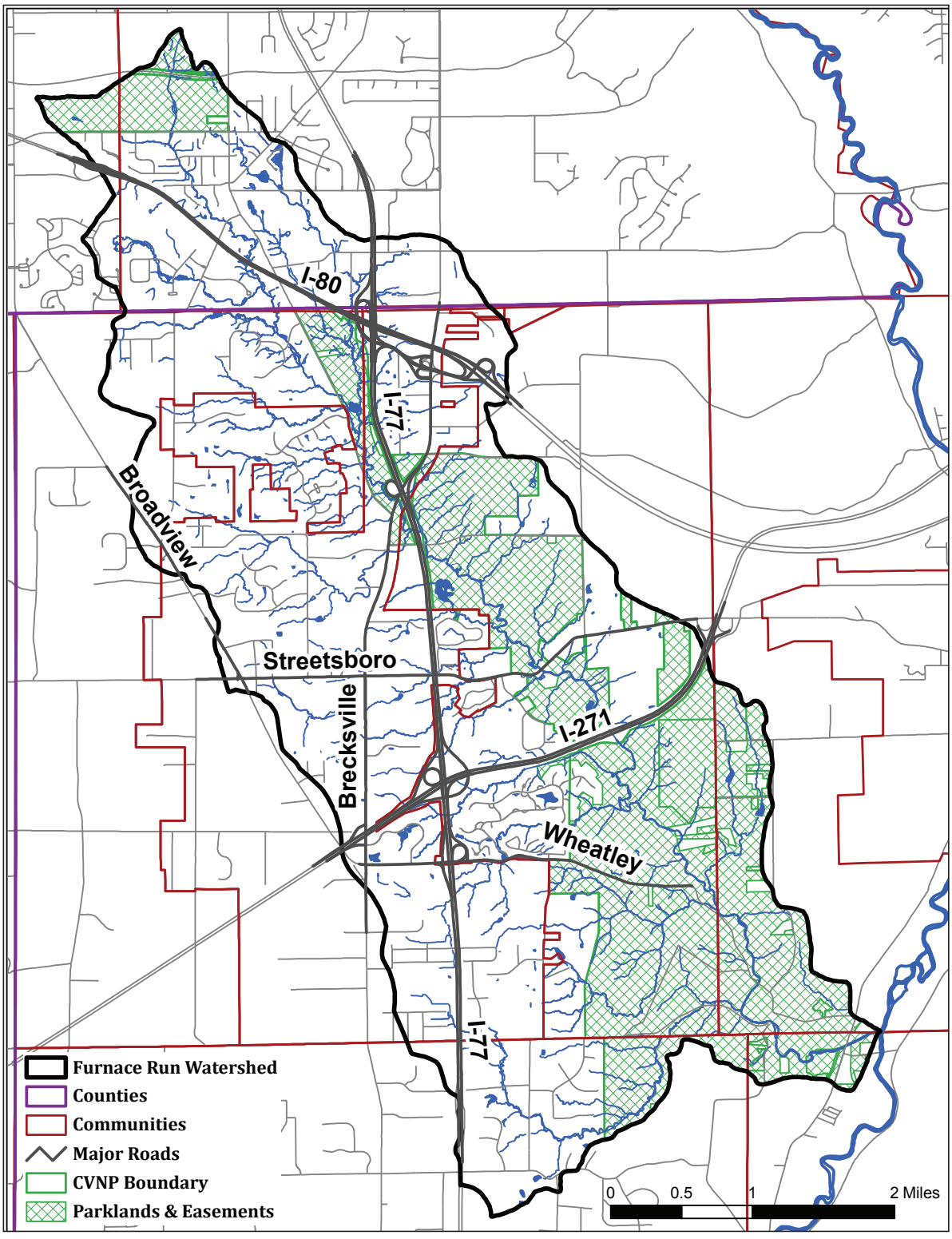


Furnace Run
Balancing Development with Watershed Stewardship

Identifying Potential Development Areas Away from Critical Watershed Features

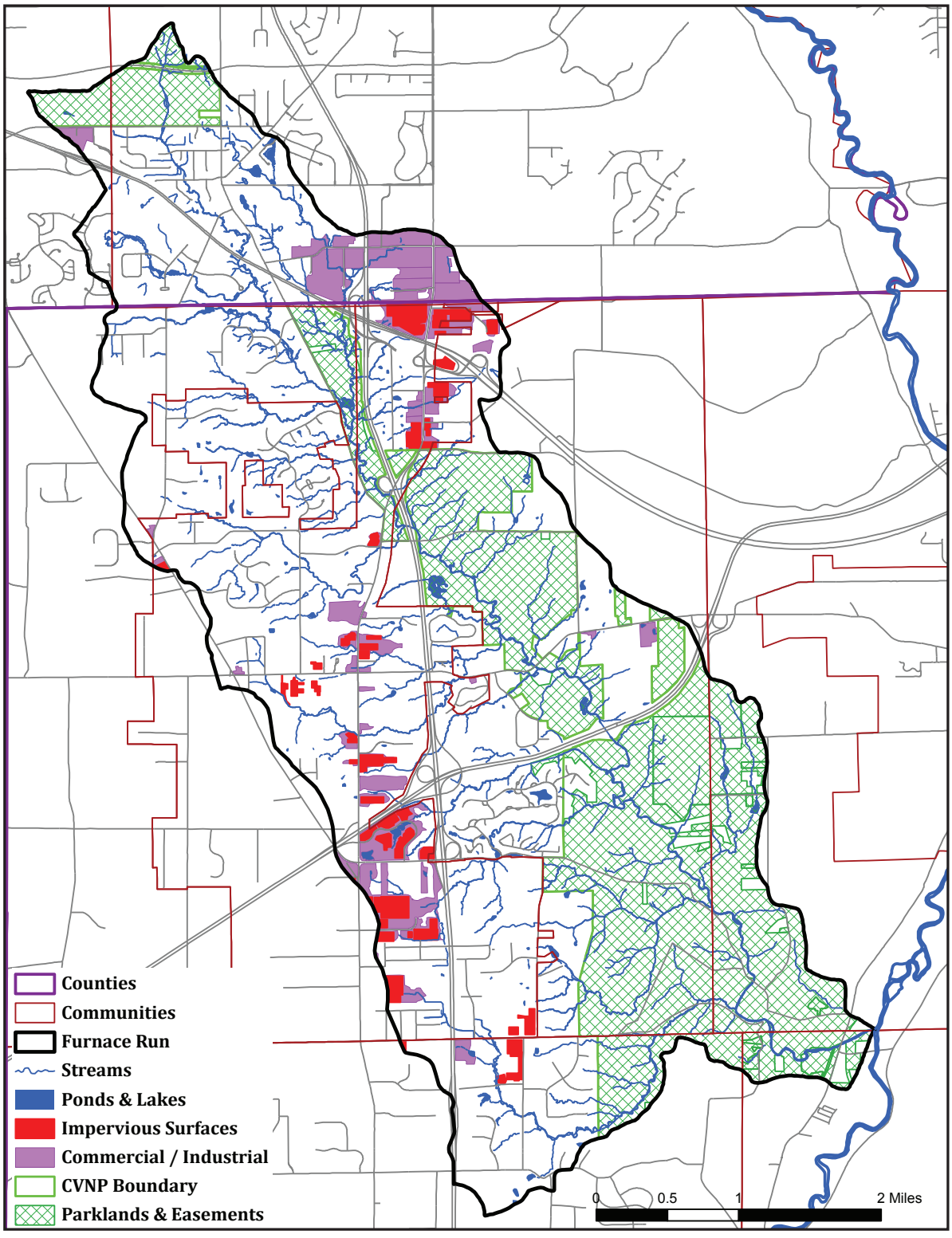


Identifying locations of main roads
and access to highway interchanges

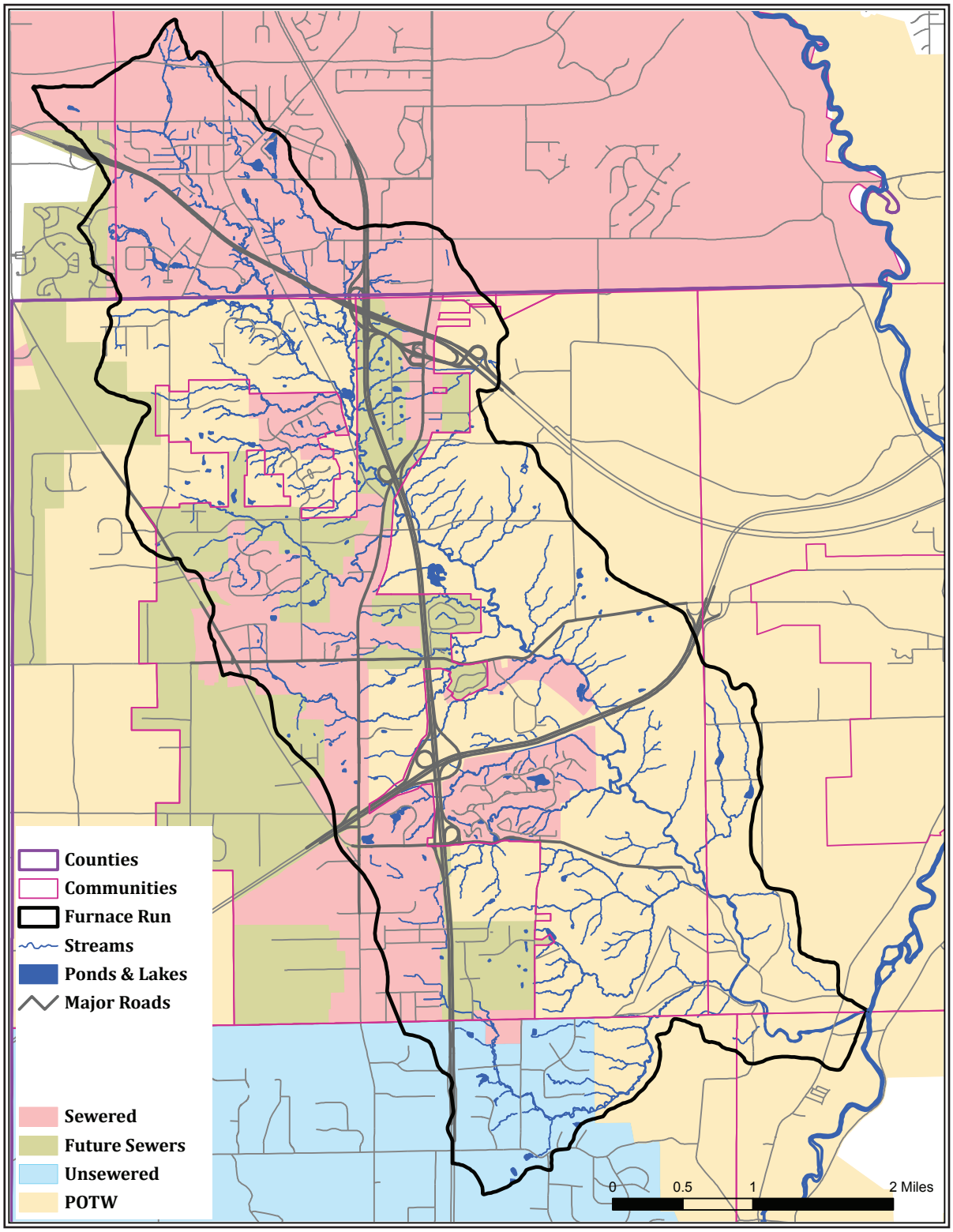


Balancing Development with Watershed Stewardship

Identifying existing impervious surfaces, commercial and industrial areas



Identifying existing and planned sewer systems



The results of the analyses of the location of Critical Watershed Features, combined with identification of land areas based on the watershed partnership's criteria for priority areas for conservation, development and agriculture, yielded the inventory of sites shown at right.

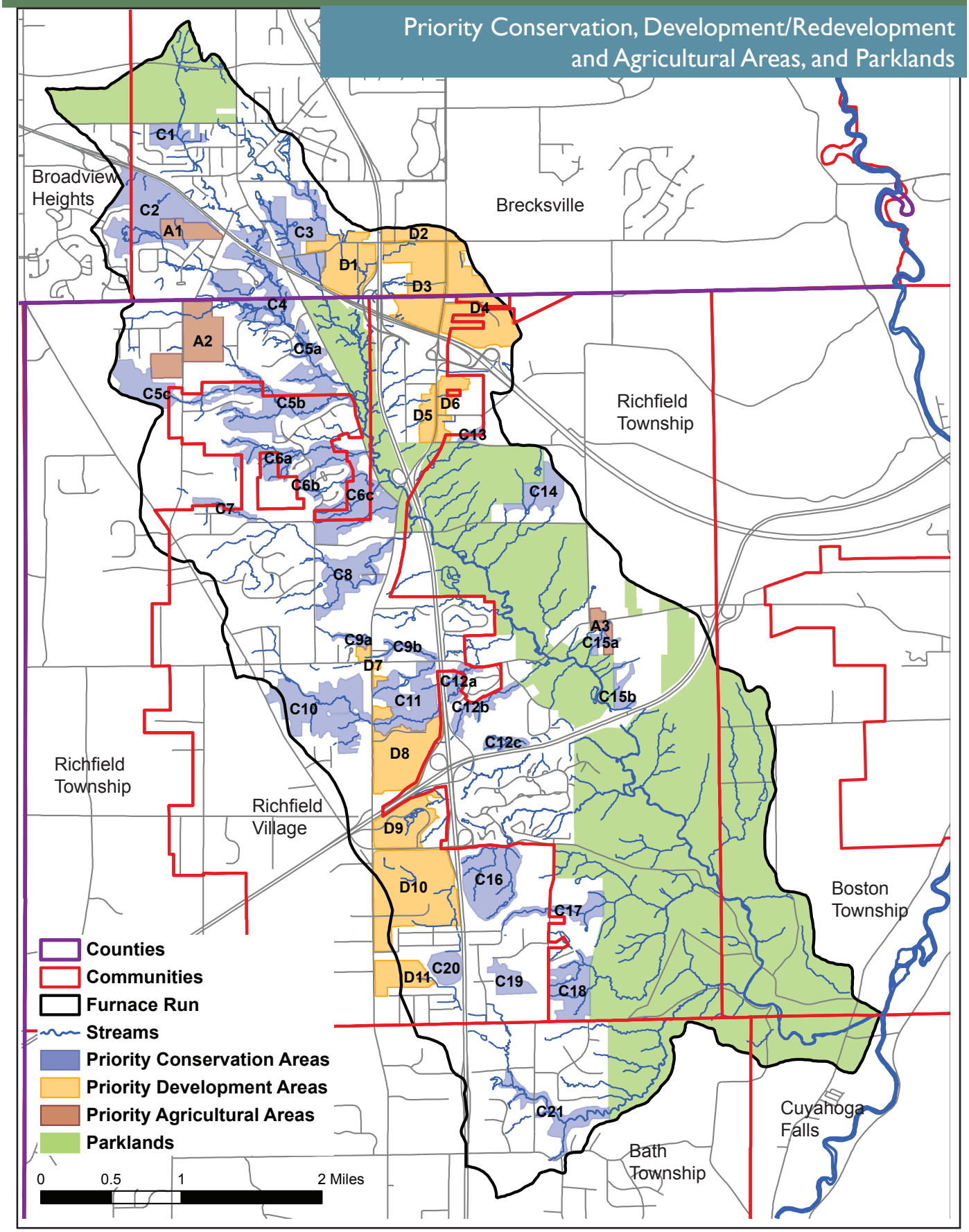
On the following pages, we define the planning categories, show how they were defined, and present a detailed map and description of each site.

In all cases, Critical Watershed Features are to be protected or avoided, whether or not they are adjacent to or surrounded by a PDA or PAA (see example on page 83, where the watershed features running through PDA #D10 are shown in yellow.

The table below offers a summary of how these locations are distributed among the watershed communities.

COMMUNITY	# of PCAs	PCA ACRES	# of PDAs	PDA ACRES	# of PAAs	PAA ACRES
Brecksville	4	323.5	4	254,4	1	34.2
Broadview Heights	1	32.3	0	0	0	0
Richfield Township	19	457.1	4	54.0	2	113.6
Richfield Village	18	761.6	9	469.1	0	0
Boston Township	0	0	0	0	0	0
Bath Township	1	58.4	0	0	0	0
Cuyahoga Falls	0	0	0	0	0	0
TOTAL	43	1632.9	17	777.5	3	147.8

Priority Conservation, Development/Redevelopment and Agricultural Areas, and Parklands



PCA

Priority Conservation Areas

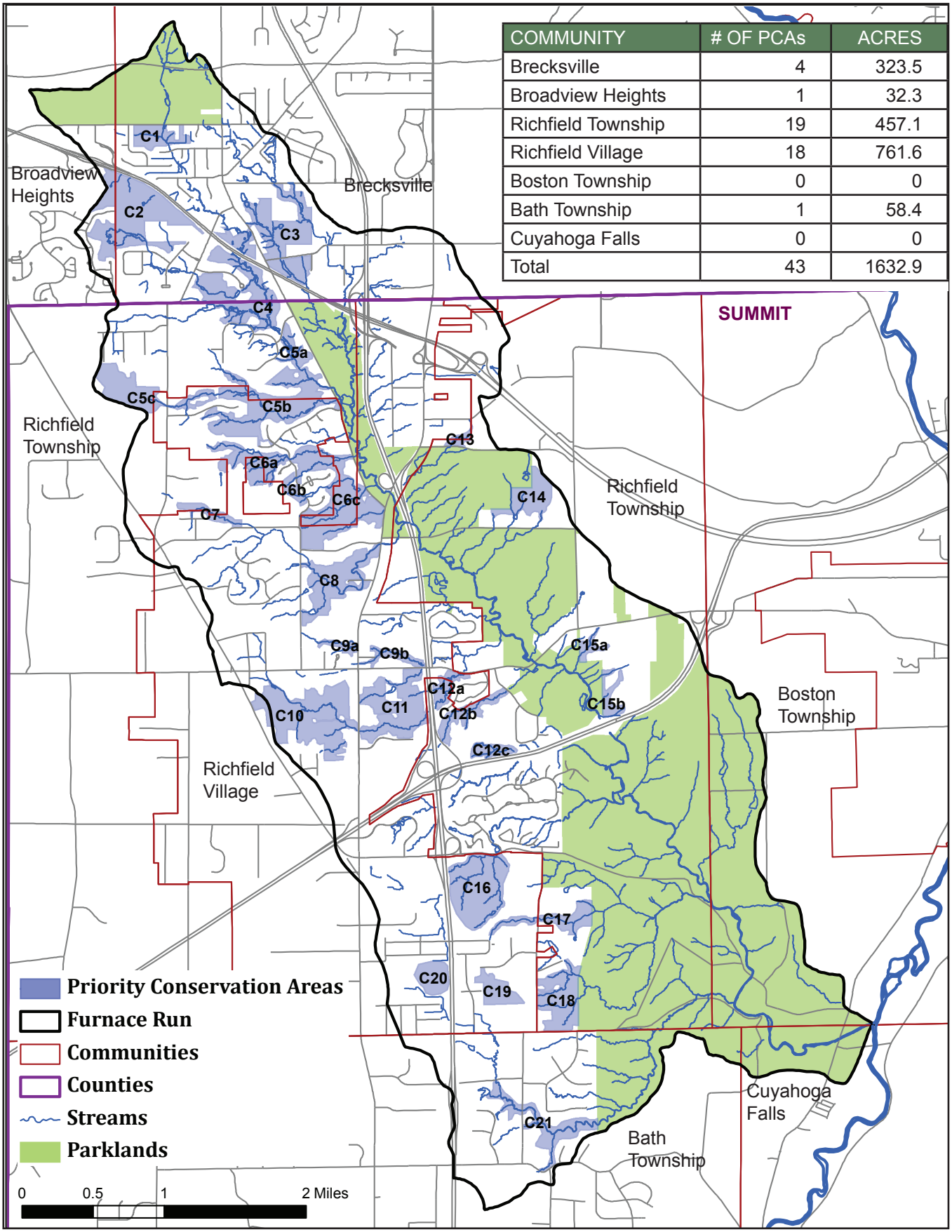
Priority conservation areas are locations where land use change is predicted to have a high impact on the watershed in terms of flooding, erosion, and water quality, based on the analysis of several data sets representing criteria that the watershed planning partners determined were of interest.

Criteria for determining Priority Conservation areas are linked to the recognition of watershed issues to protect and restore critical stream features which will attenuate discharge, flow, energy and erosion.

	CRITERIA for identifying PRIORITY CONSERVATION AREAS in the FURNACE RUN WATERSHED
	Listed in order of preference
1	Stream banks and adjacent vegetated corridors for erosion prevention
2	Steep slopes for erosion protection
3	Forest corridors for flow and bank stability
4	Floodplains for flood water management
5	Soils which are highly erosive and fragile
6	Small streams and primary headwater areas for flow management
7	Soils that support wetlands
8	Soils that allow high infiltration for storm water
9	Wetlands for flood water management
10	Areas in imminent danger of property damage or loss from flooding or erosion
11	Forest areas which provide significant habitat and connections
12	Wetlands for water quality and filtering
13	Stream banks and adjacent vegetated corridors for habitat benefit

Priority Conservation Areas

COMMUNITY	# OF PCAs	ACRES
Brecksville	4	323.5
Broadview Heights	1	32.3
Richfield Township	19	457.1
Richfield Village	18	761.6
Boston Township	0	0
Bath Township	1	58.4
Cuyahoga Falls	0	0
Total	43	1632.9



Furnace Run

On the following pages are detailed maps and descriptions of each PCA chosen by the partnership for prioritization. These tables offer the numbers associated with each area.

The table below shows how much of the existing Critical Features can be protected by including them in PCAs.

PCA Analysis by Critical Features

Critical Natural Features	Total Acres in Watershed	Percent of Watershed	Acres in PCAs	Percent of Watershed Total in PCAs	Non-Park Acres
Watershed Total	13118.2	100.0	1632.8	12.4	8946.5
Wetlands	364.3	2.8	146.5	40.2	277.4
Wetland Buffers	1176.2	9.0	204.8	17.4	597.4
Riparian Setbacks	1048.3	8.0	275.6	26.3	587.5
Riparian Areas	4578.8	34.8	969.6	21.2	1850.0
Forest	6340.9	48.3	1462.9	23.1	3197.4
Critical Soils	2030.0	15.5	384.1	18.9	493.2
Steep Slopes	2710.8	20.6	440.6	16.3	1220.2

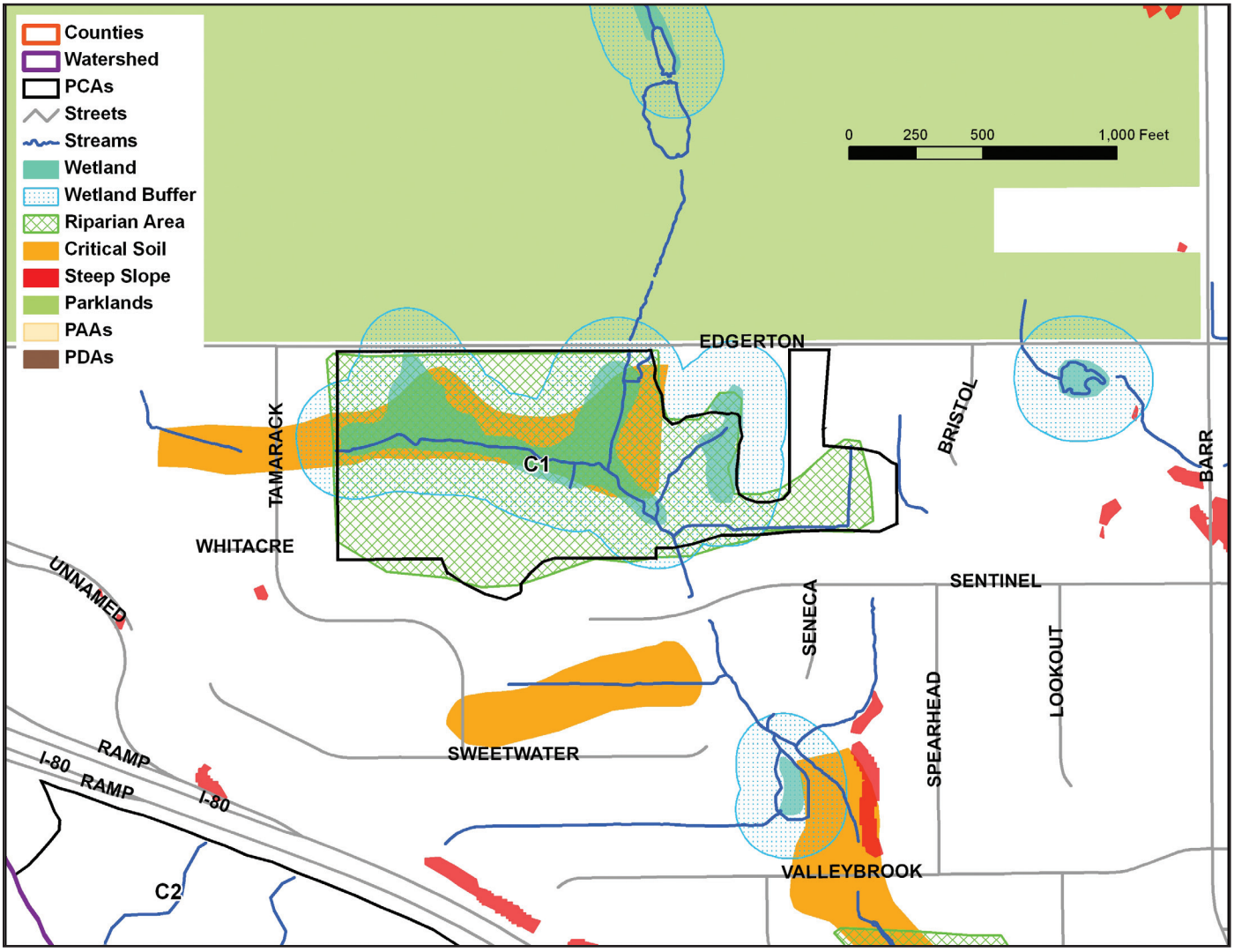
This table helps decisionmakers protect specific Critical Watershed Features by showing the extent of each feature in each PCA. For example, if forest acres are targeted, it would be advantageous to focus efforts on PCAs # C6c, C10, C5b, etc.

Analysis of Critical Features in PCAs

PCA	Acres	Wetland Acres in PCA	Wetland Buffers Acres in PCA	Riparian Setback Acres in PCA	Riparian Area Acres in PCA	Forest Acres in PCA	Steep Slope Acres in PCA	Critical Soil Acres in PCA	Number of Parcels
C1	29.8	6.1	13.3	4.1	27.2	28.6	0.0	7.76	9
C2	139.9	32.9	15.1	9.0	0.0	111.4	1.2	21.83	30
C3	121.3	16.5	53.8	21.7	98.7	106.5	9.7	0	12
C4	103.9	3.0	18.0	36.0	89.1	76.3	31.5	13.57	35
C5a	18.6	0.0	0.0	8.3	0.0	16.5	7.7	1.76	10
C5b	135.5	1.5	3.2	27.4	91.2	125.5	47.7	47.3	42
C5c	67.2	54.4	1.3	3.5	18.6	52.6	4.6	7.34	11
C6a	50.7	0.1	1.4	9.9	42.2	46.6	24.2	26.3	15
C6b	9.4	0.0	0.0	1.6	7.2	8.9	3.2	4.64	4
C6c	137.1	0.4	4.5	19.5	127.9	130.9	38.5	23.62	25
C7	16.4	0.0	0.0	2.8	15.8	13.6	4.9	3.3	11
C8	77.9	0.6	8.5	21.8	73.9	69.7	30.3	19.27	26
C9a	8.6	0.0	0.0	2.6	6.0	7.9	3.5	0	7
C9b	15.2	1.6	7.9	3.9	13.1	12.8	8.3	9.56	7
C10	143.0	1.7	6.8	9.6	48.1	127.8	25.9	8.04	19
C11	93.3	4.0	20.1	15.3	38.0	88.8	19.0	17.52	18
C12a	19.5	0.2	1.1	10.2	15.8	19.2	11.5	7.99	3
C12b	29.1	0.0	0.0	5.2	21.8	28.7	19.6	22.5	4
C12c	15.0	0.0	0.0	3.7	7.5	14.7	6.1	5.64	2
C13	7.3	0.0	0.0	1.7	7.2	6.4	0.3	0	6
C14	42.9	9.4	13.6	2.2	42.0	40.6	0.7	0.96	18
C15a	10.8	0.0	0.0	1.5	8.2	10.5	7.4	5.01	2
C15b	17.0	0.0	0.0	2.1	14.2	12.3	13.8	9.06	1
C16	107.2	0.3	2.9	14.0	44.3	103.5	37.7	40.88	6
C17	36.8	0.0	0.0	6.4	29.9	35.9	26.6	22.2	5
C18	65.8	0.1	2.3	7.7	28.1	61.2	16.0	13.82	8
C19	27.3	9.3	14.4	0.0	0.0	26.6	0.0	0	5
C20	28.1	4.3	16.2	0.0	0.0	25.5	0.0	0	3
C21	58.4	0.0	0.3	24.2	53.5	53.4	40.9	44.2	31

Furnace Run

Priority Conservation Area #C1



CRITICAL WATERSHED FEATURES

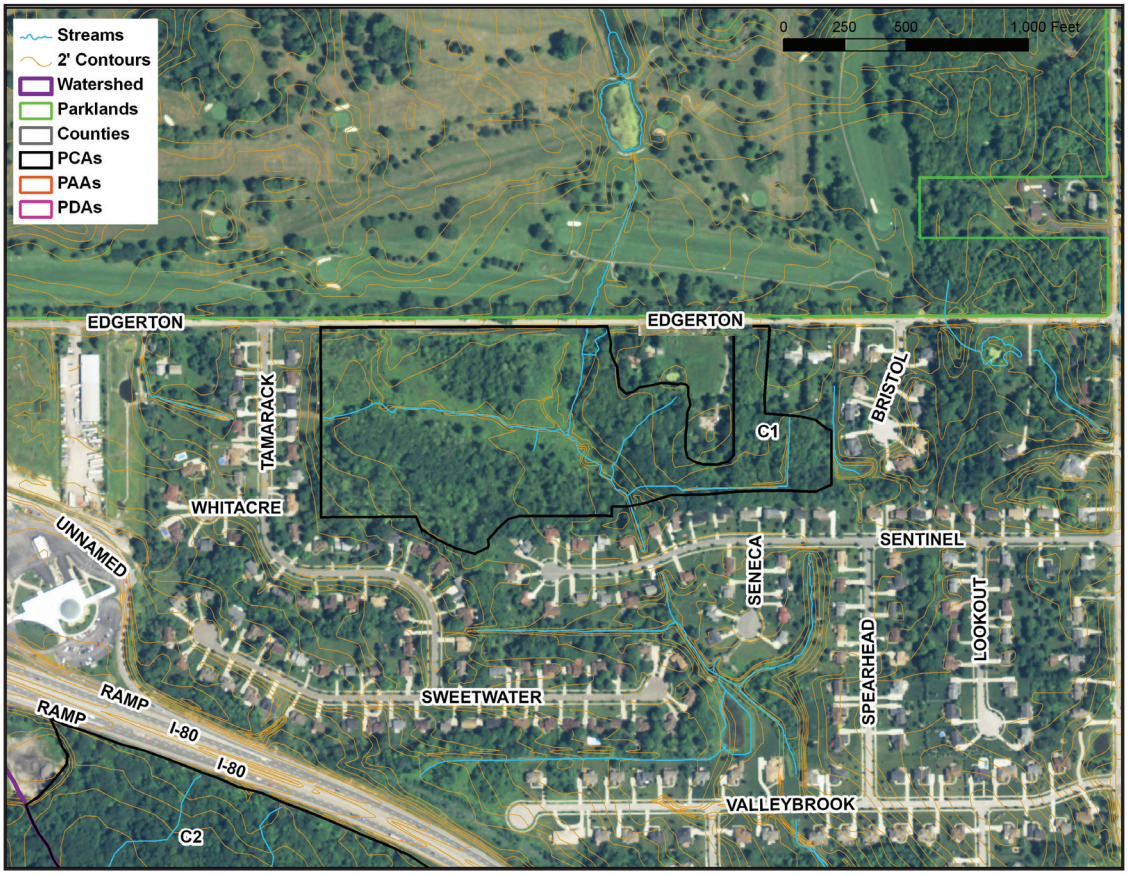
Priority Conservation Area C1

PCA C1 is located in the City of Brecksville in Cuyahoga County. This site is south of Cleveland Metroparks property along Edgerton Road, between Broadview and Barr Roads, east of I-80.

PCA C1 is in the northwest portion of the watershed. A tributary stream flows north to south and several headwater streams flow east to west. Almost the entire site is covered by forest and is considered riparian area.

Name	C1
Acres	29.8
Wetland Acres in PCA	6.1
Wetland Buffers Acres in PCA	13.3
Riparian Setback Acres in PCA	4.1
Riparian Area Acres in PCA	27.2
Forest Acres in PCA	28.6
Steep Slope Acres in PCA	0.0
Critical Soil Acres in PCA	7.76
Number of Parcels	9

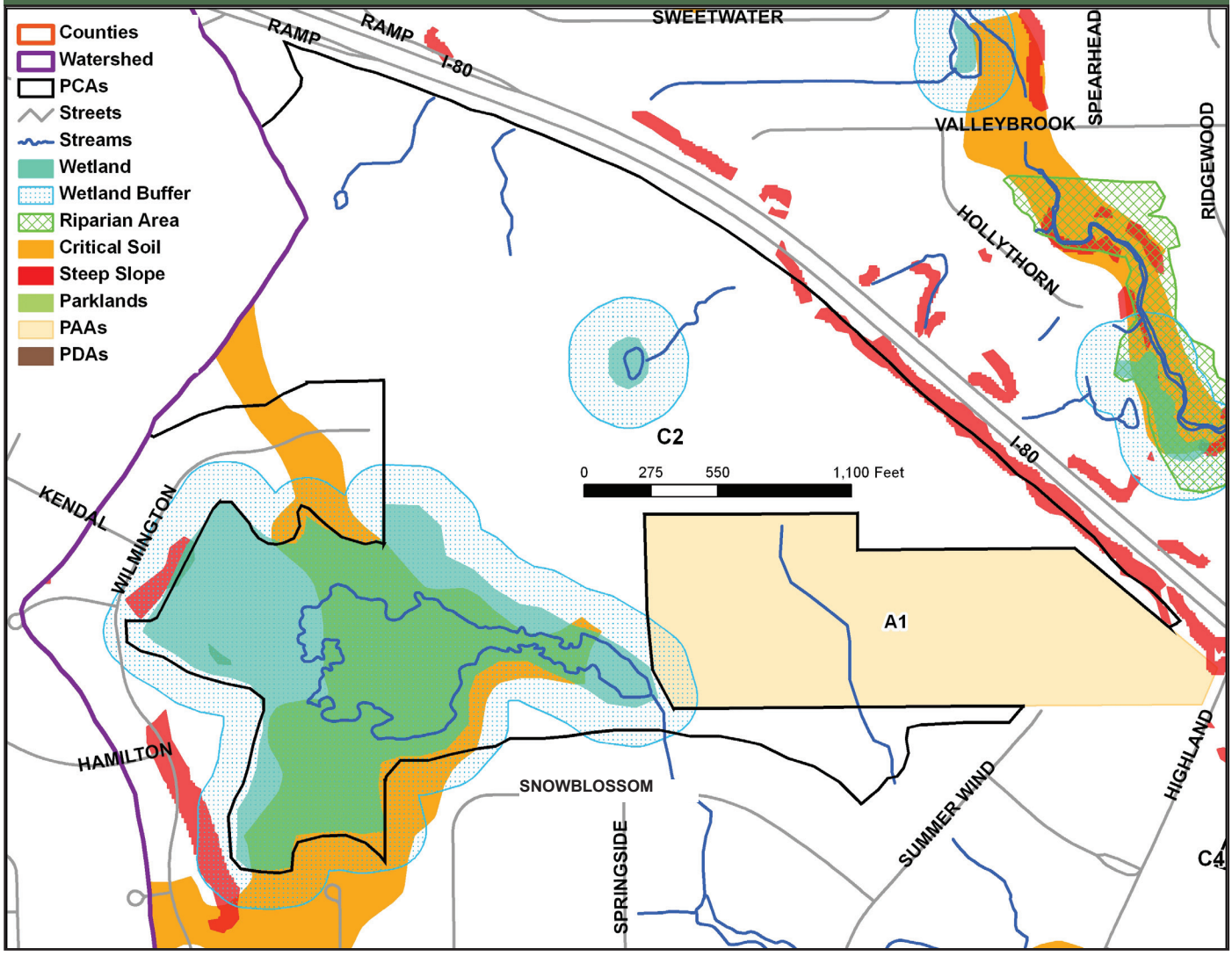
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C2



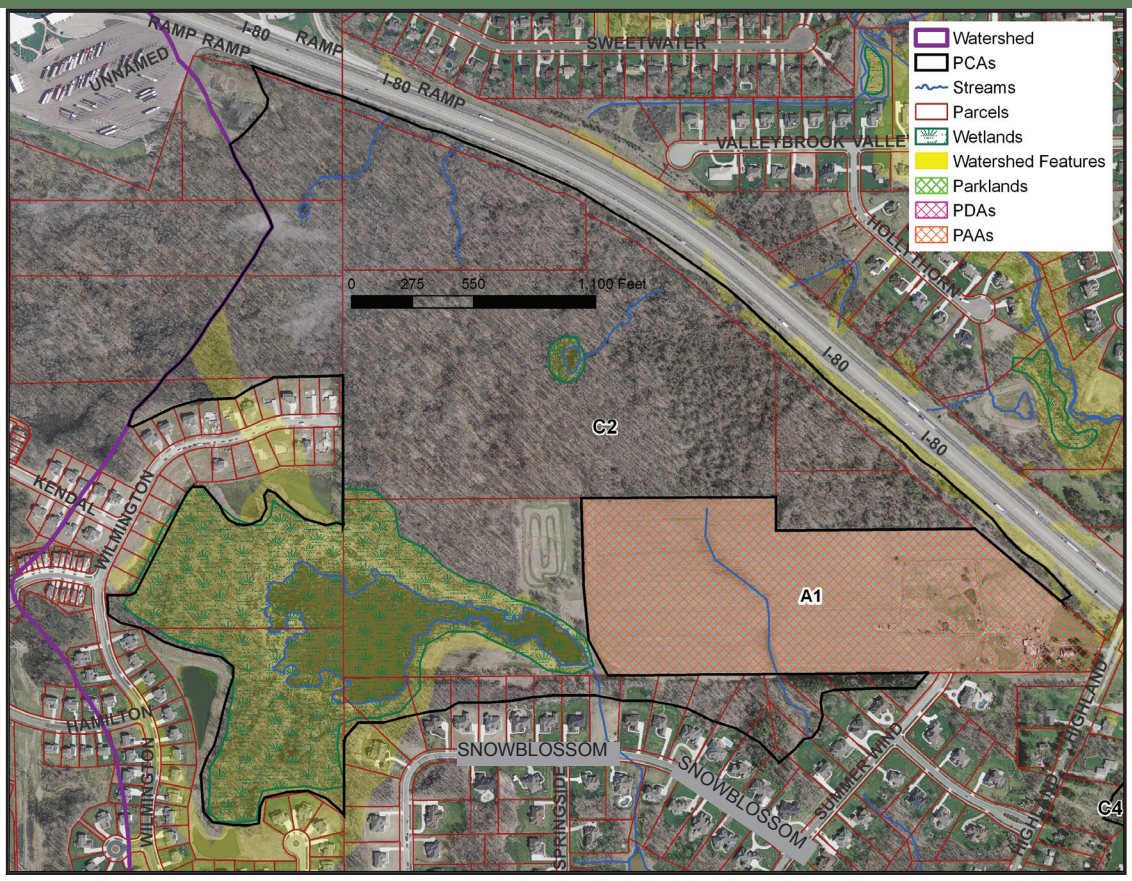
CRITICAL WATERSHED FEATURES

Priority Conservation Area C2

PCA C2 is located in the Cities of Brecksville & Broadview Heights in Cuyahoga County. This site lies south of I-80 and northwest of Highland Road. It abuts PAA A1 to the east.

PCA C2 is in the northwest portion of the watershed. This upper headwater stream area is almost completely forested and most probably there are additional headwater streams.

Name	C2
Acres	139.9
Wetland Acres in PCA	32.9
Wetland Buffers Acres in PCA	15.1
Riparian Setback Acres in PCA	9.0
Riparian Area Acres in PCA	0.0
Forest Acres in PCA	111.4
Steep Slope Acres in PCA	1.2
Critical Soil Acres in PCA	21.8
Number of Parcels	30.0

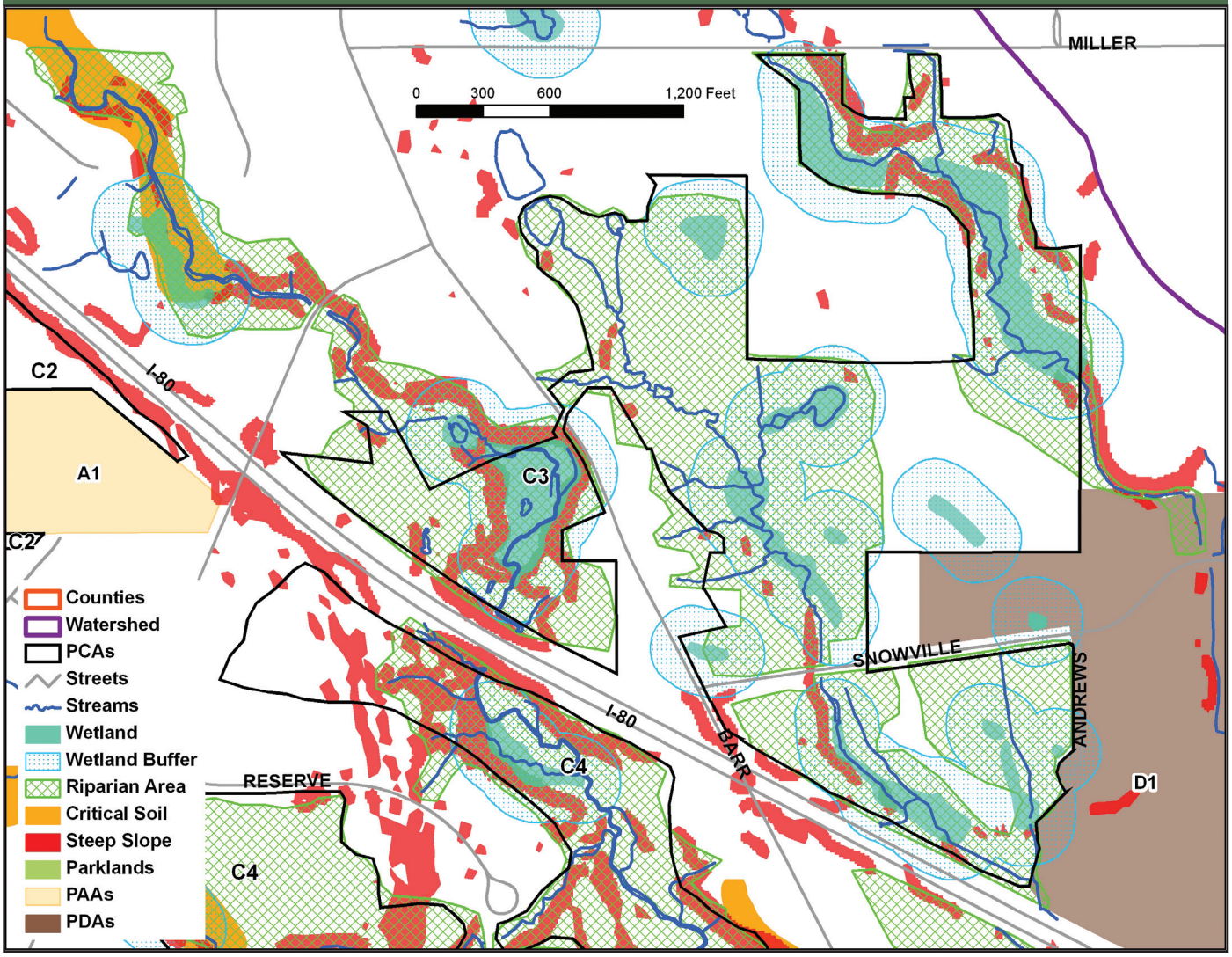


SPRING 2006 - PARCELS & WETLANDS

SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C3



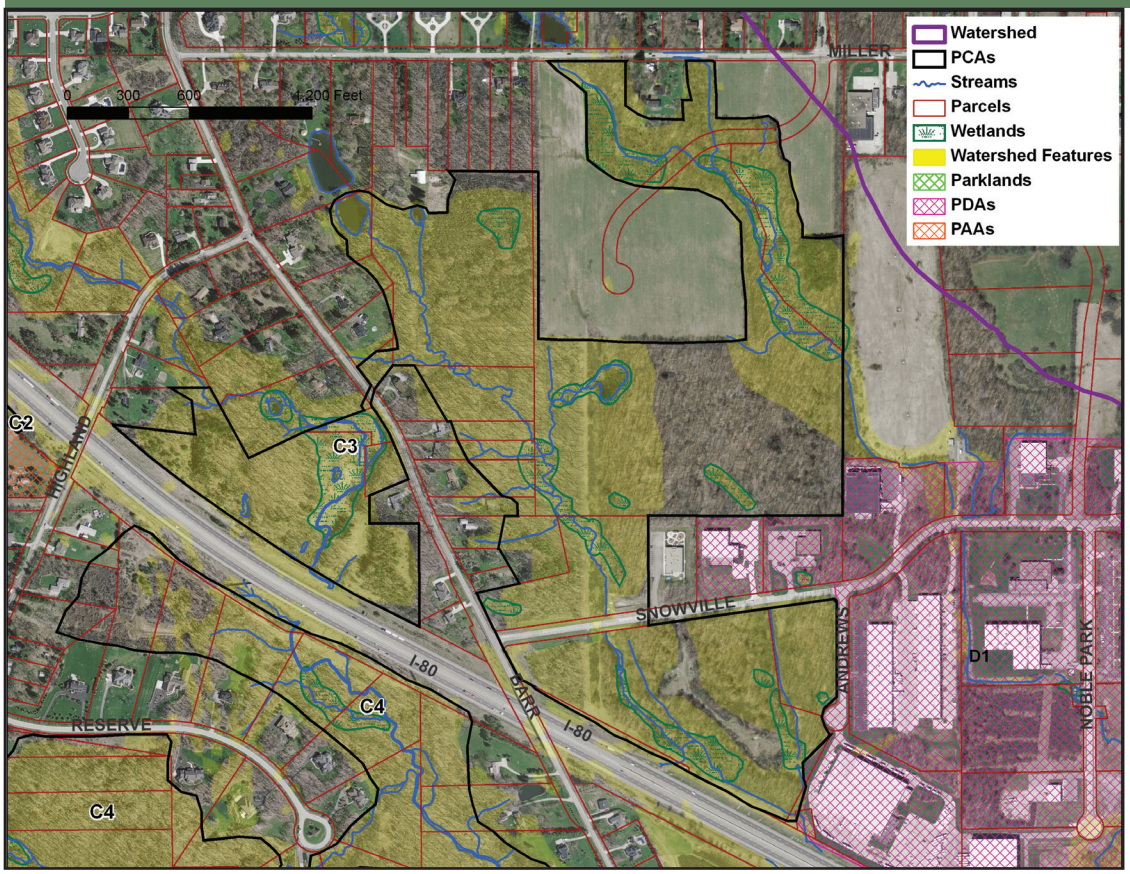
CRITICAL WATERSHED FEATURES

Priority Conservation Area C3

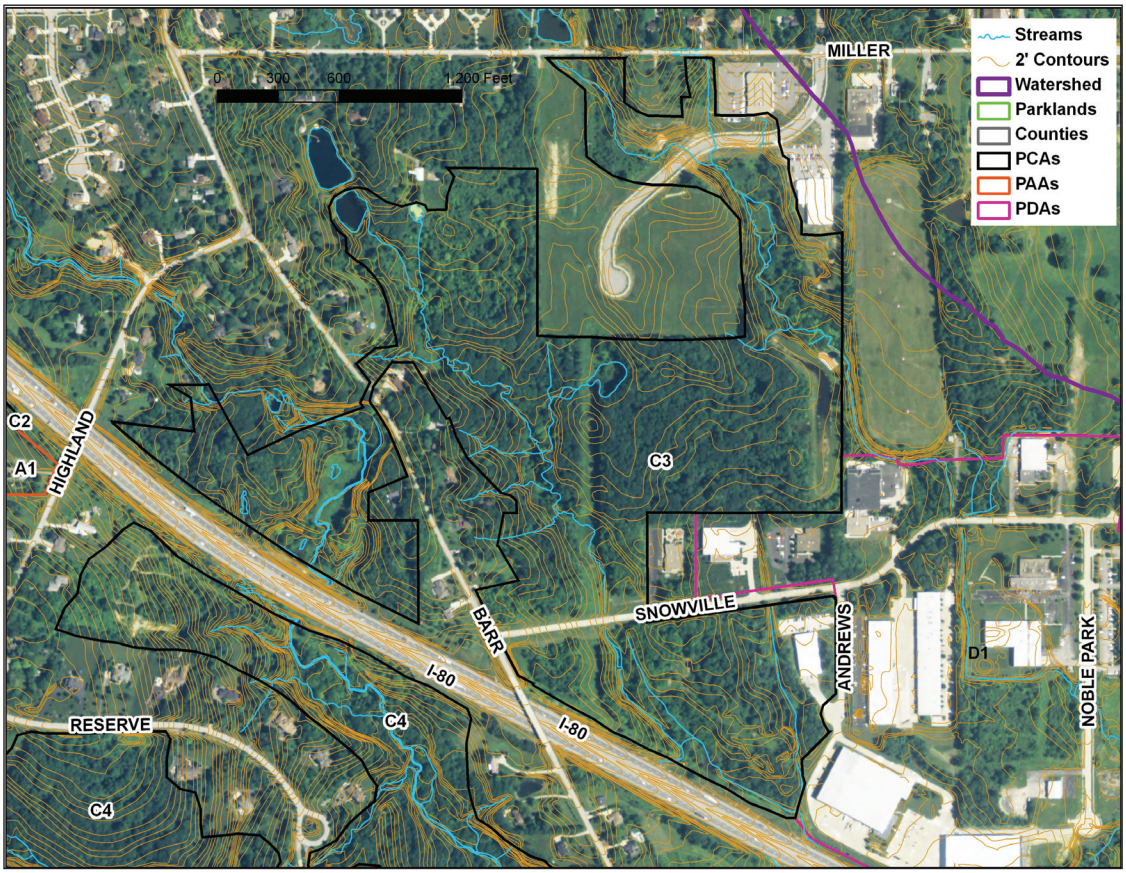
PCA C3 is located in the City of Brecksville in Cuyahoga County. This site is northwest of where Highland Road crosses I-80. It extends across Barr Road, straddles Snowville Road and extends northward to Miller Road. It abuts PDA D1 to the east.

PCA C3 is on the northeast side of the watershed. This site contains headwater streams and three separate tributary streams. Most of the site is considered riparian area and at least half is wetland buffer.

Name	C3
Acres	121.3
Wetland Acres in PCA	16.5
Wetland Buffers Acres in PCA	53.8
Riparian Setback Acres in PCA	21.7
Riparian Area Acres in PCA	98.7
Forest Acres in PCA	106.5
Steep Slope Acres in PCA	9.7
Critical Soil Acres in PCA	0
Number of Parcels	12



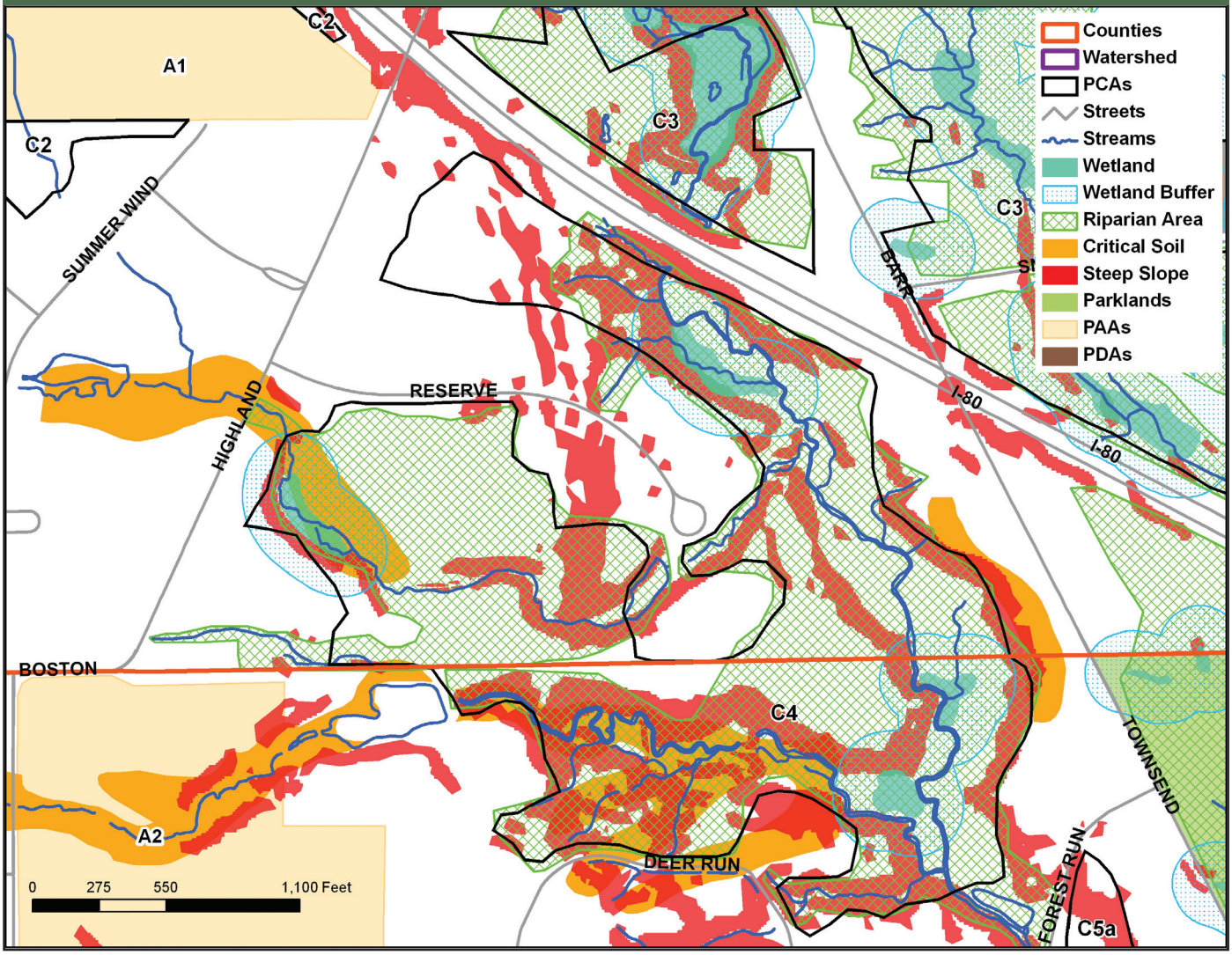
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C4



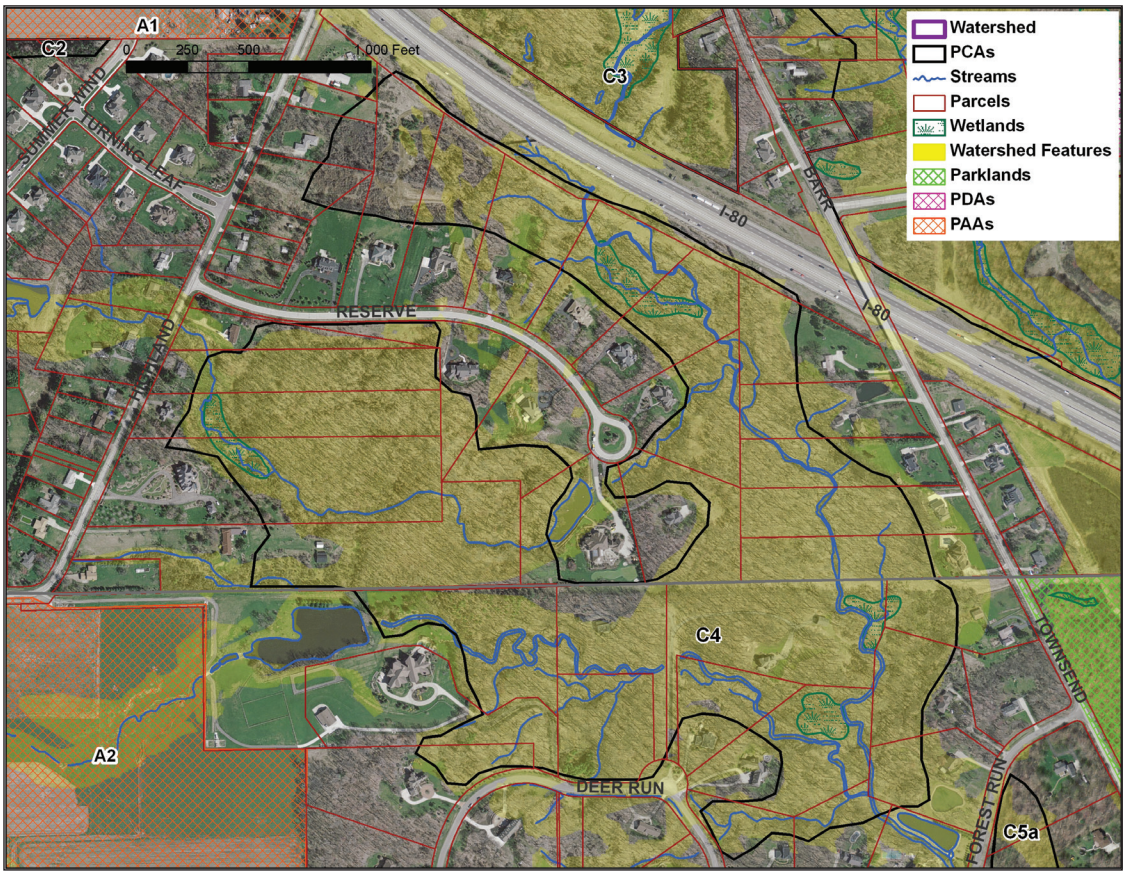
CRITICAL WATERSHED FEATURES

Priority Conservation Area C4

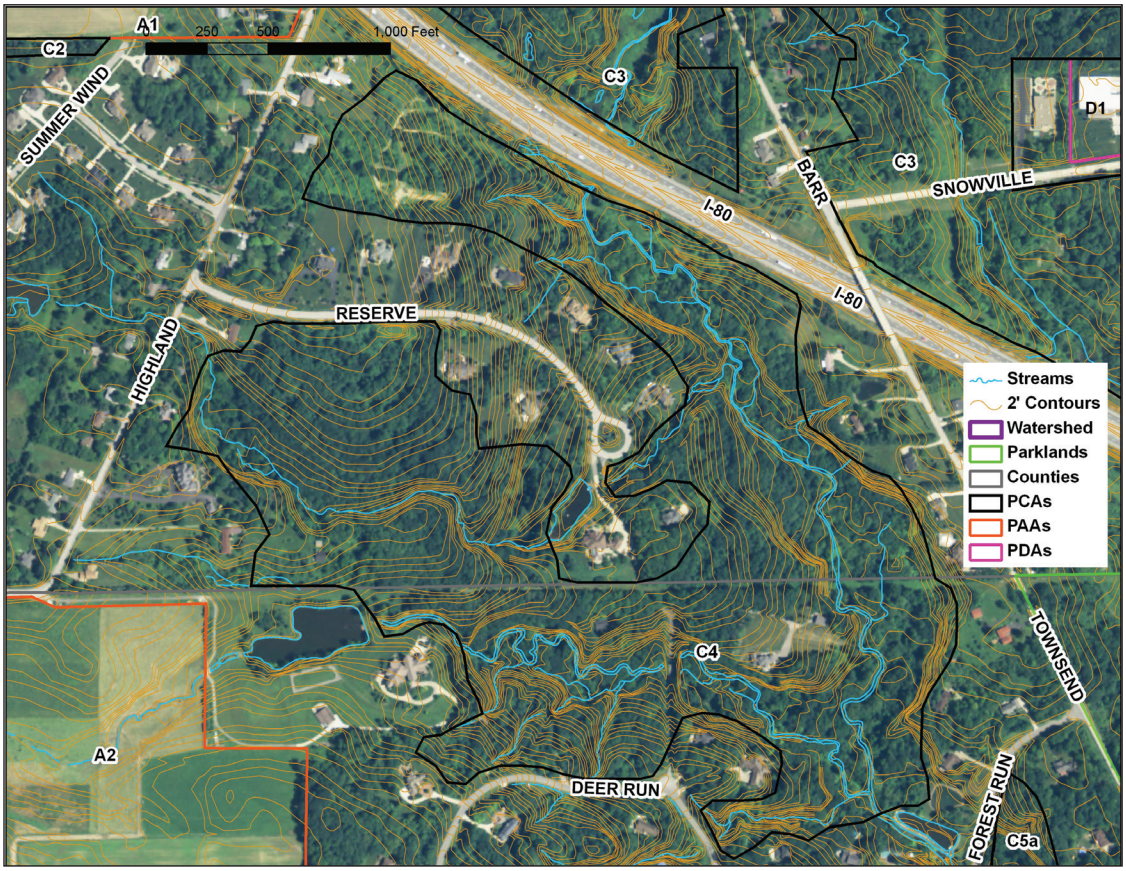
PCA C4 is in the City of Brecksville in Cuyahoga County and Richfield Township in Summit County. This site lies south of I-80 between Townsend and Highland Roads.

PCA C4 is in the north central portion of the watershed. Two tributary streams flow though steep sided valleys to join with a larger tributary stream. It contains four small high quality forested wetlands and nearly the entire site is forested riparian area.

Name	C4
Acres	103.9
Wetland Acres in PCA	3.0
Wetland Buffers Acres in PCA	18.0
Riparian Setback Acres in PCA	36.0
Riparian Area Acres in PCA	89.1
Forest Acres in PCA	76.3
Steep Slope Acres in PCA	31.5
Critical Soil Acres in PCA	13.6
Number of Parcels	35.0



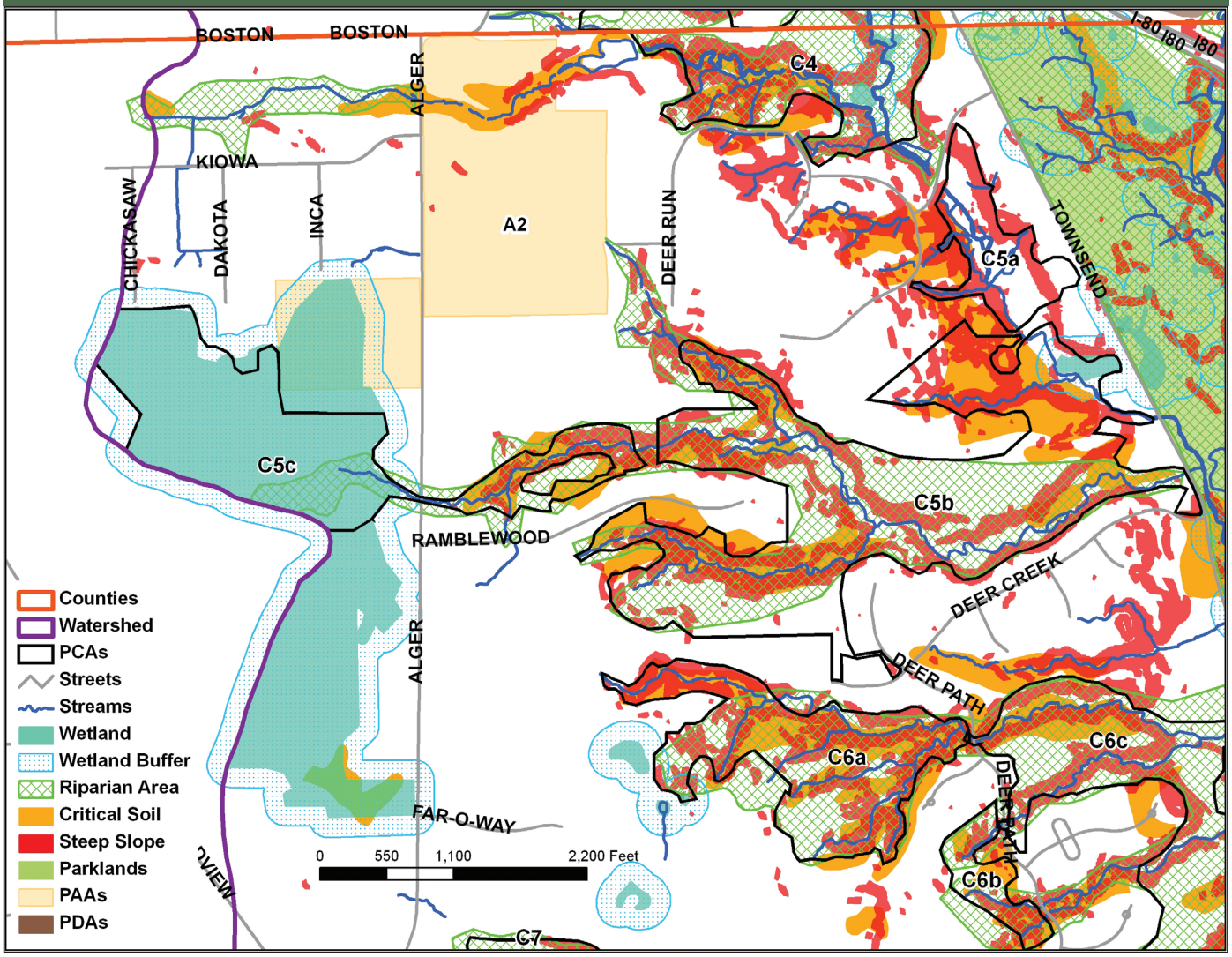
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C5



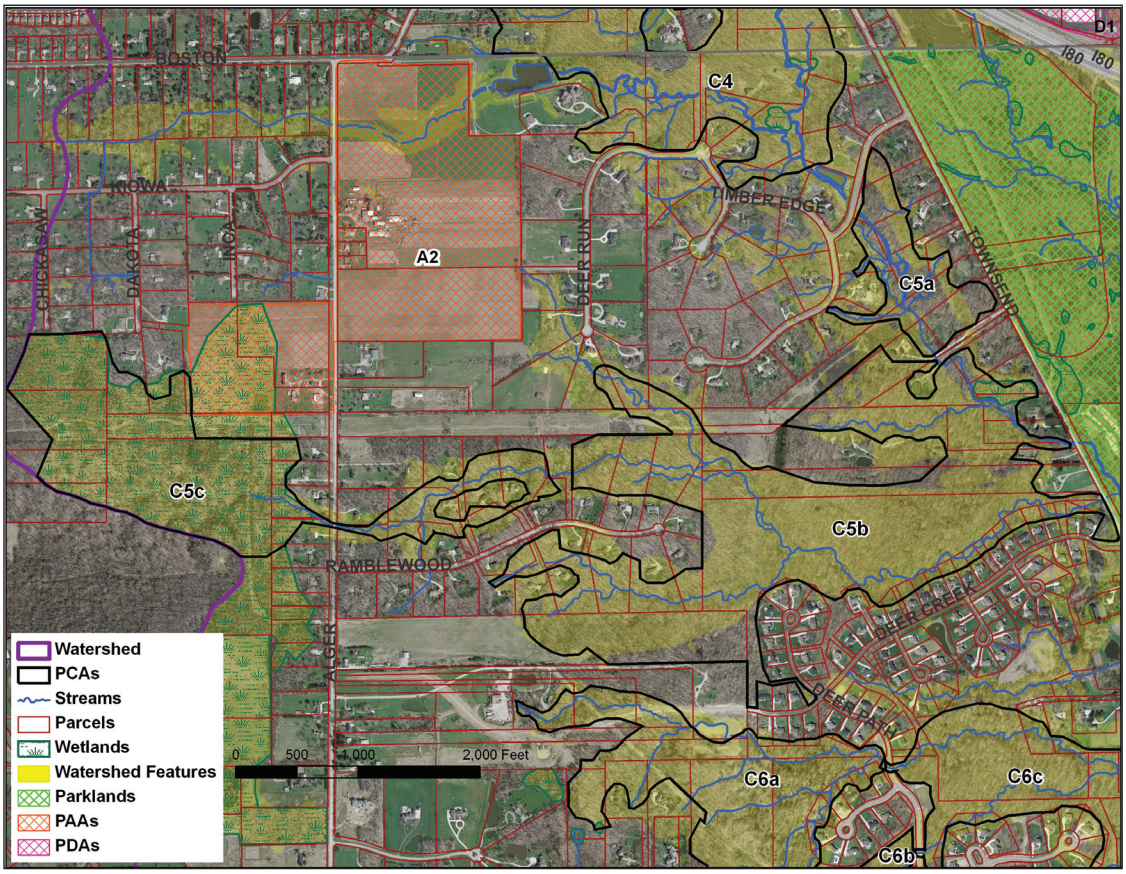
CRITICAL WATERSHED FEATURES

Priority Conservation Area C5a, C5b & C5c

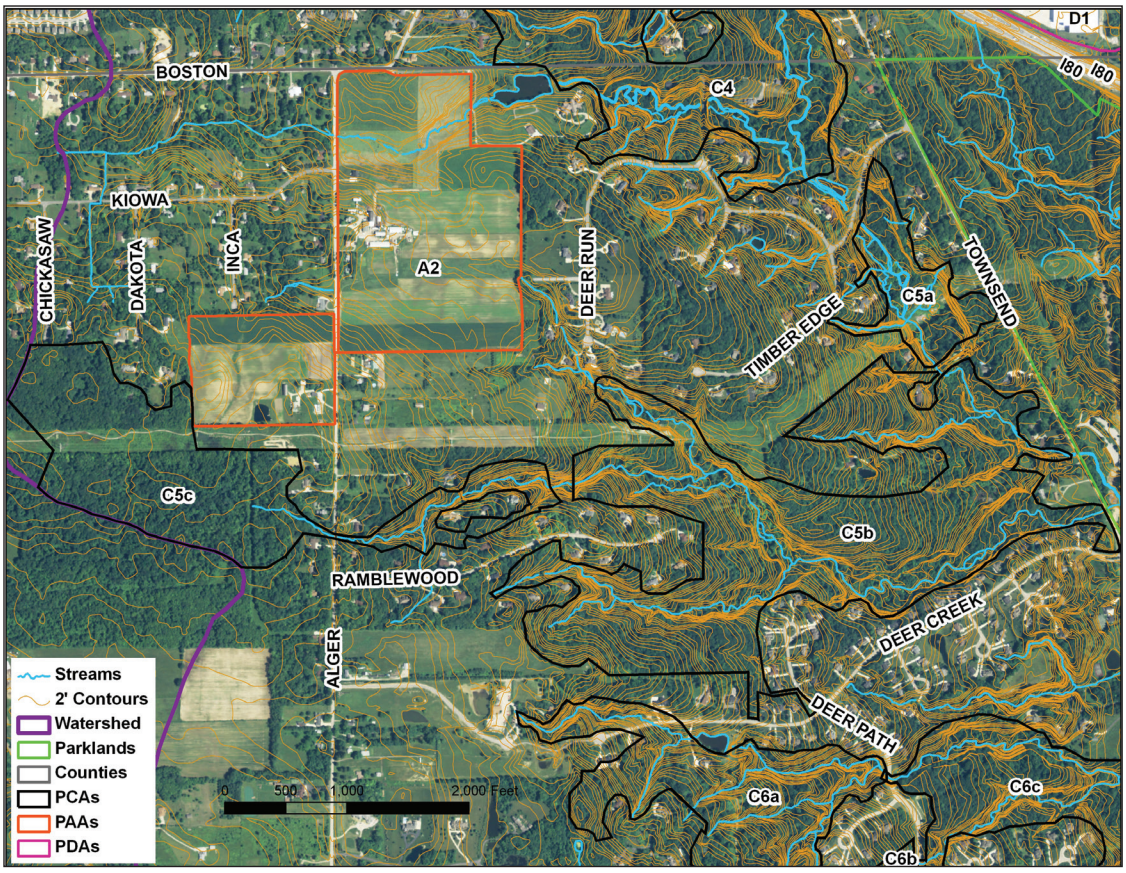
PCA C5 is located in both Richfield Village and Township in Summit County. This site lies south of Boston Road between Broadview and Townsend Roads.

The western part of C5c is covered by a large forested wetland and drained by a headwater stream flowing east through a steep-sided valley and forested riparian areas. It joins similar headwater streams in C5b to form a larger tributary stream that flows under Townsend Road into Furnace Run in the Metro Park. Site C5a has a tangle of streams that create a single tributary, which also flows under Townsend Road into the Metro Park.

Name	C5a	C5b	C5c
Acres	18.6	135.5	67.2
Wetland Acres in PCA	0.0	1.5	54.4
Wetland Buffers Acres in PCA	0.0	3.2	1.3
Riparian Setback Acres in PCA	8.3	27.4	3.5
Riparian Area Acres in PCA	0.0	91.2	18.6
Forest Acres in PCA	16.5	125.5	52.6
Steep Slope Acres in PCA	7.7	47.7	4.6
Critical Soil Acres in PCA	1.8	47.3	7.3
Number of Parcels	10.0	42.0	11.0



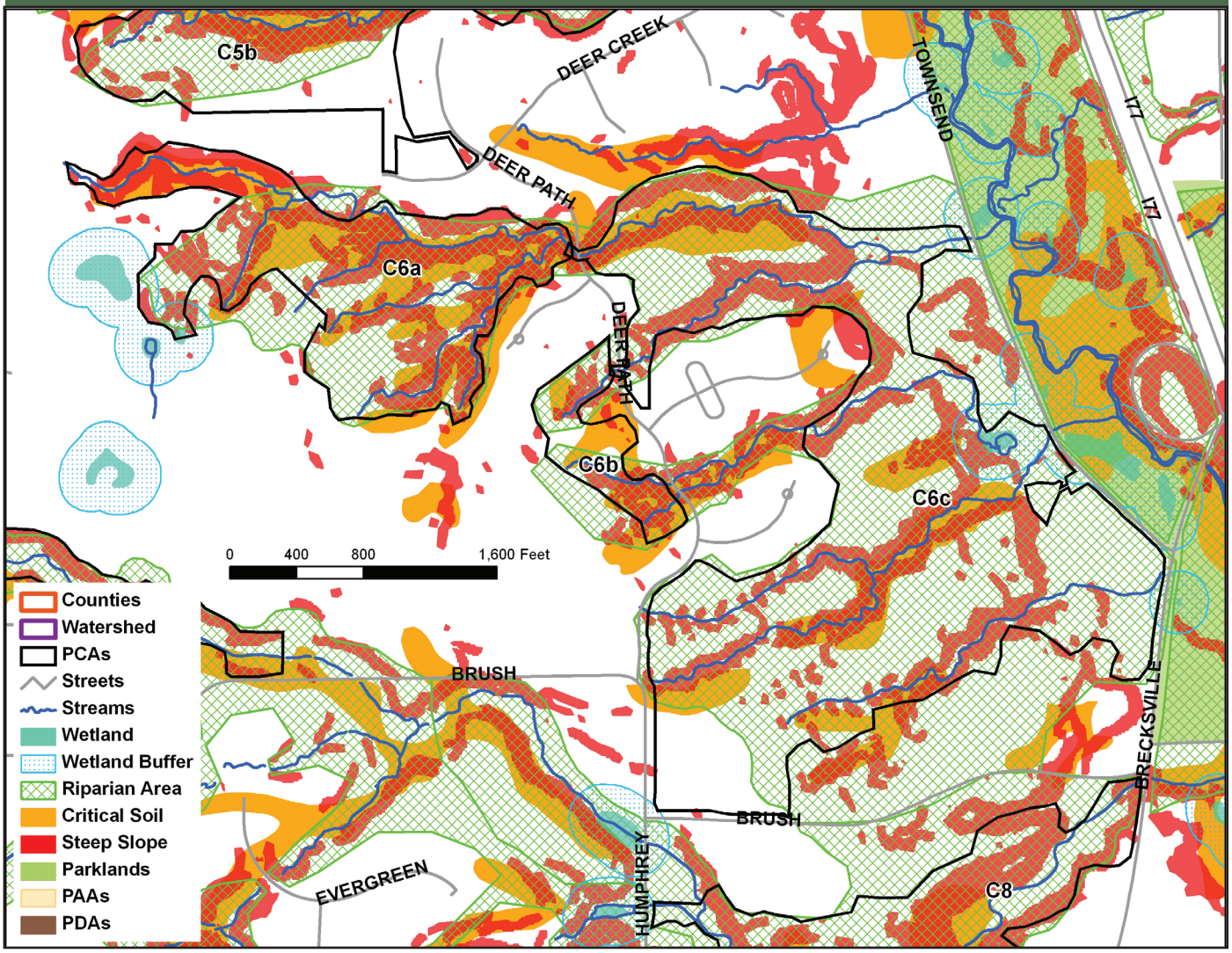
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C6



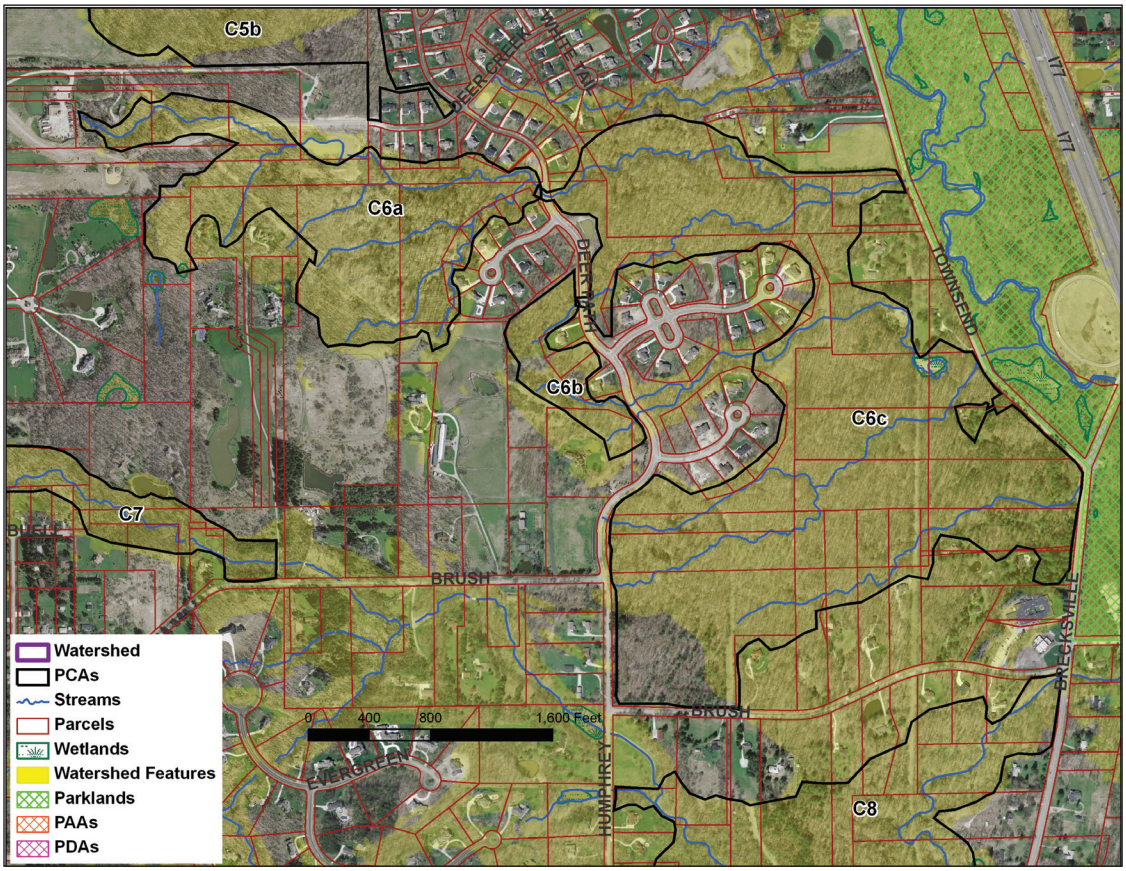
CRITICAL WATERSHED FEATURES

Priority Conservation Area C6

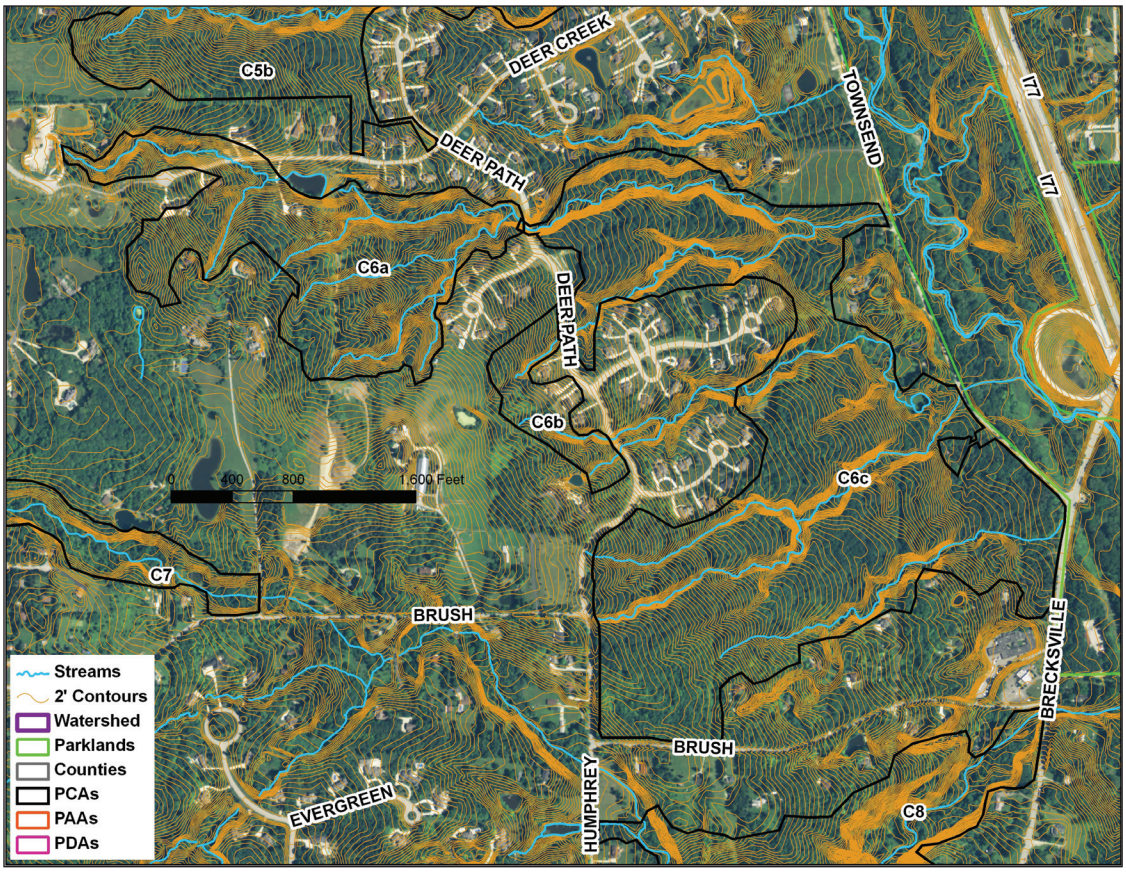
PCA C6 is located in both Richfield Village and Township in Summit County. This site is north of Brush Road between Brecksville and Townsend Roads.

PCA C6 is centrally located within the watershed. This site is characterized by headwater and tributary streams flowing eastward through steep-sided valleys and forested riparian areas. The streams flow under Townsend Road and into Furnace Run in the Metro Park.

Name	C6a	C6b	C6c
Acres	50.7	9.4	137.1
Wetland Acres in PCA	0.1	0.0	0.4
Wetland Buffers Acres in PCA	1.4	0.0	4.5
Riparian Setback Acres in PCA	9.9	1.6	19.5
Riparian Area Acres in PCA	42.2	7.2	127.9
Forest Acres in PCA	46.6	8.9	130.9
Steep Slope Acres in PCA	24.2	3.2	38.5
Critical Soil Acres in PCA	26.3	4.6	23.6
Number of Parcels	15.0	4.0	25.0



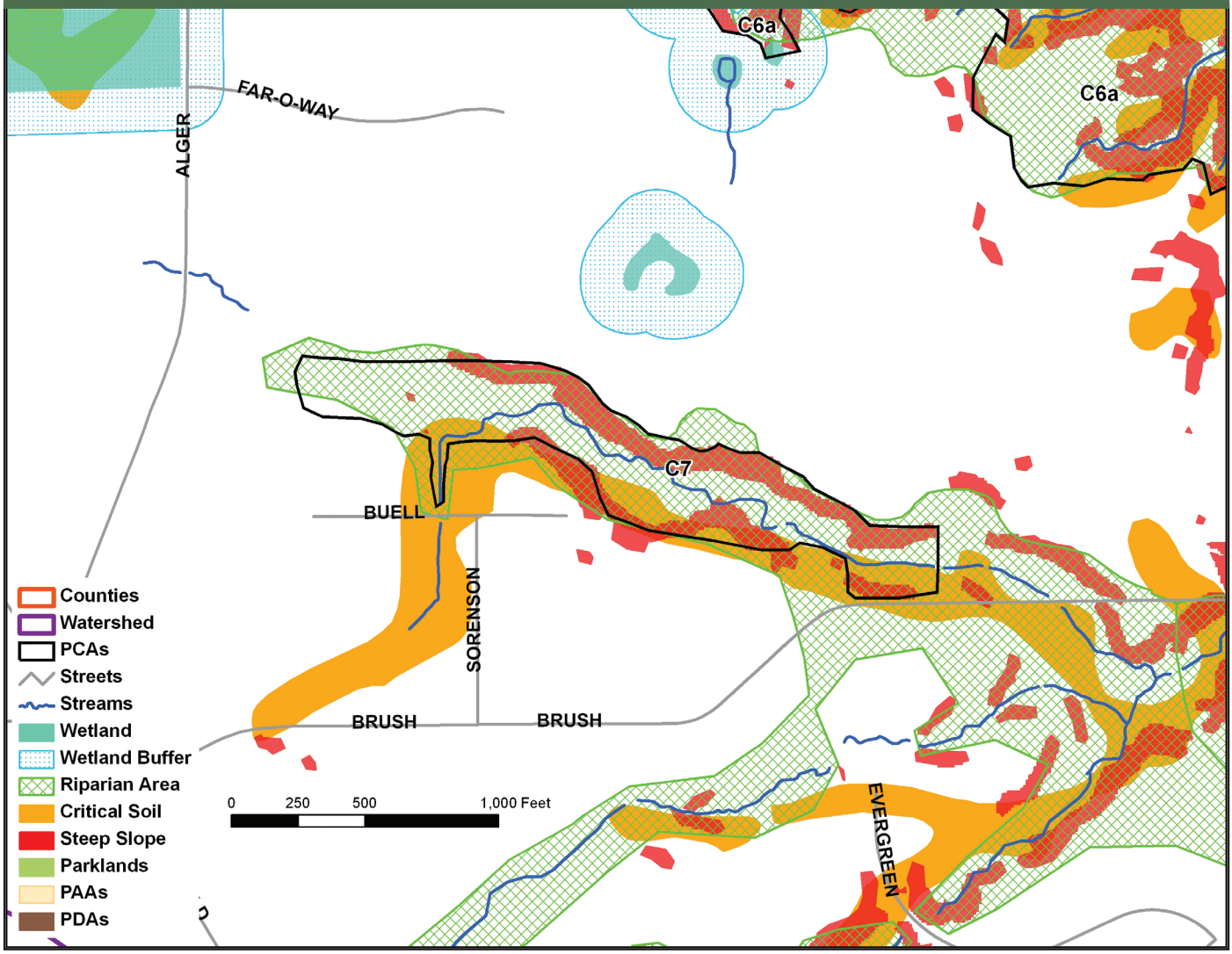
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C7



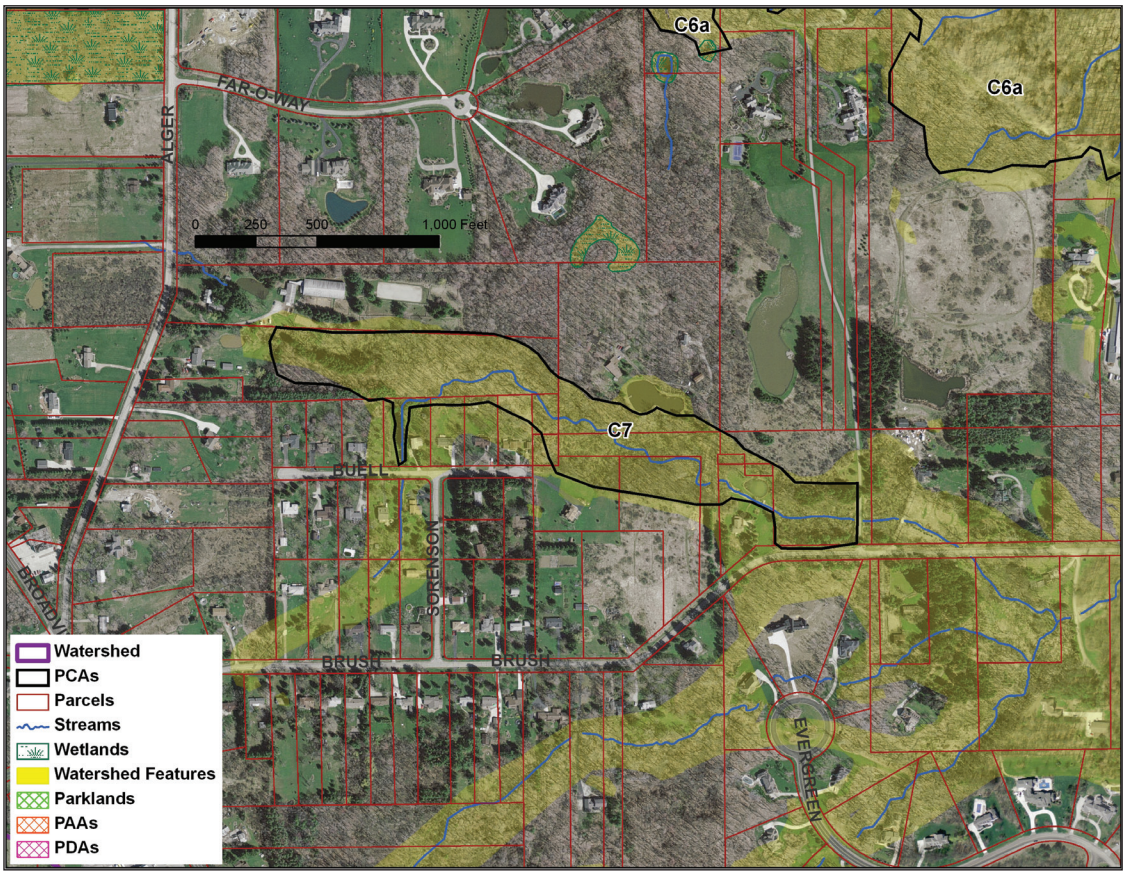
CRITICAL WATERSHED FEATURES

Priority Conservation Area C7

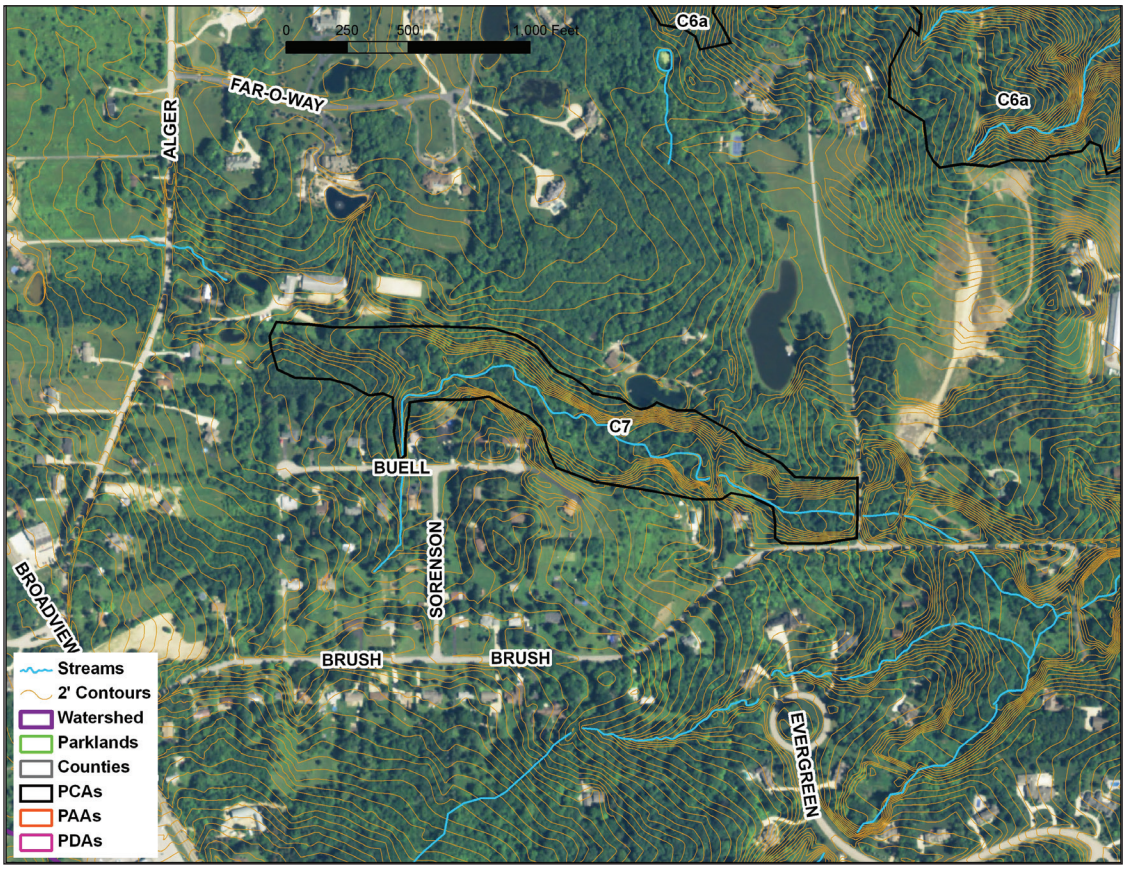
PCA C7 is located in both Richfield Village and Township in Summit County. This site is north of Brush Road between Alger and Humphrey Roads.

PCA C7 is in the west central portion of the watershed. It has a headwater stream and is a forested riparian area.

Name	C7
Acres	16.4
Wetland Acres in PCA	0.0
Wetland Buffers Acres in PCA	0.0
Riparian Setback Acres in PCA	2.8
Riparian Area Acres in PCA	15.8
Forest Acres in PCA	13.6
Steep Slope Acres in PCA	4.9
Critical Soil Acres in PCA	3.3
Number of Parcels	11



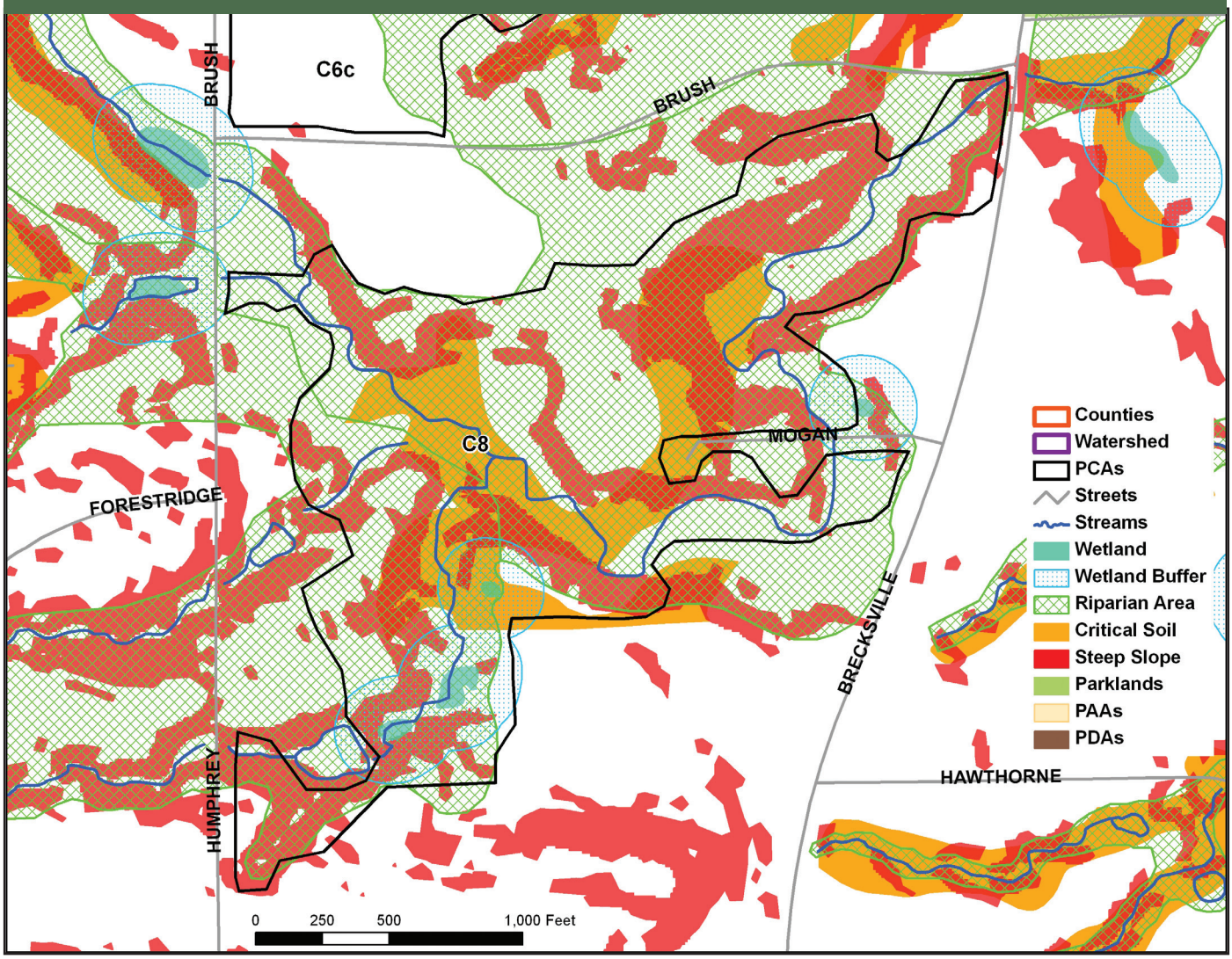
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C8



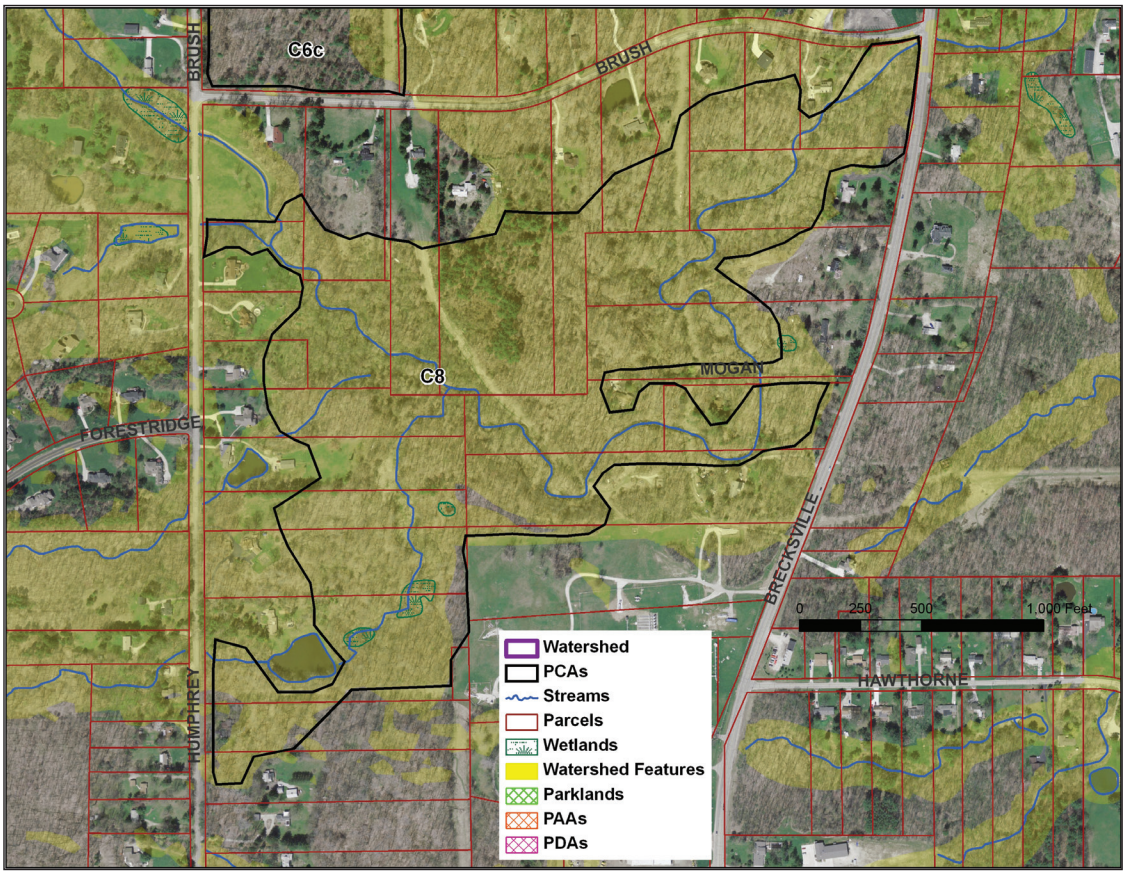
CRITICAL WATERSHED FEATURES

Priority Conservation Area C8

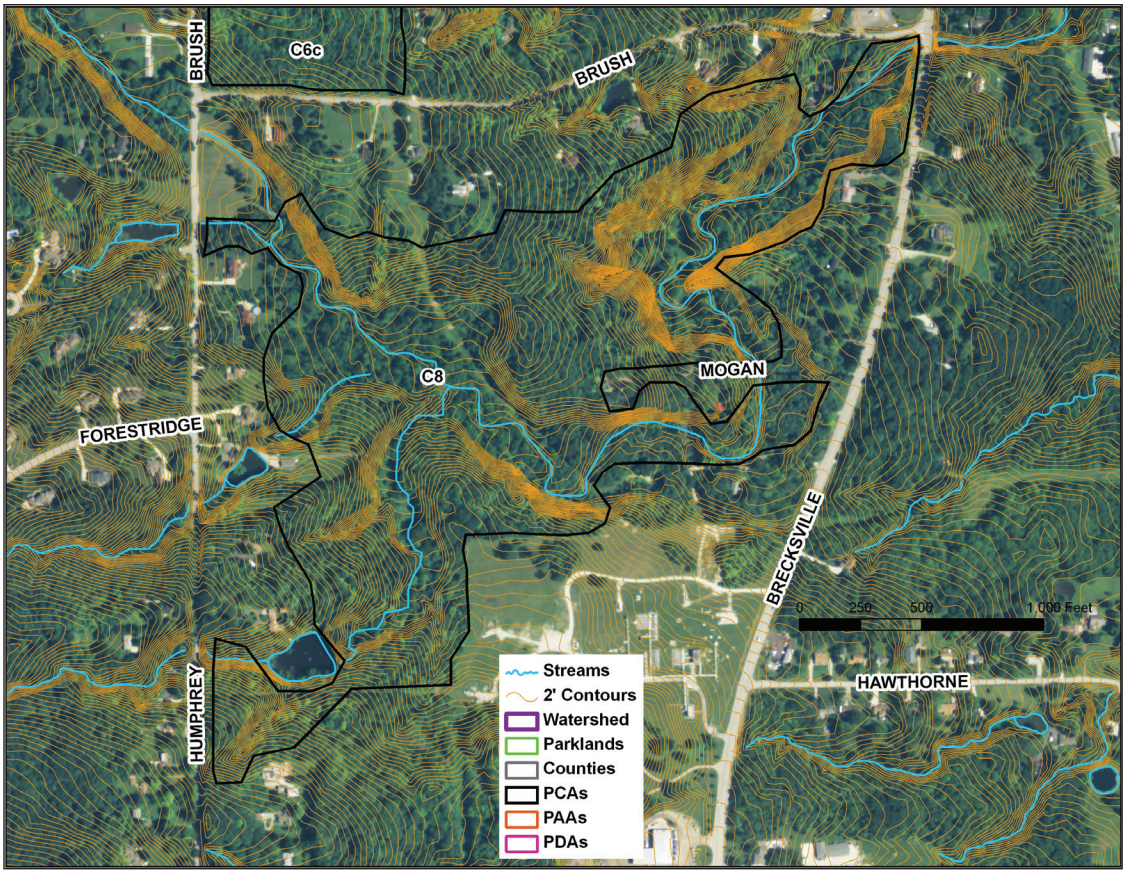
PCA C8 is located in Richfield Village in Summit County. This site is south of Brush Road between Humphrey and Brecksville Roads.

PCA C8 is centrally located within the watershed. It is at the confluence of several headwater streams flowing generally west to east, then northeast under Brecksville and Brush Roads into Furnace Run in the Metro Park. This site is characterized by steep sided valleys and forested riparian areas.

Name	C8
Acres	77.9
Wetland Acres in PCA	0.6
Wetland Buffers Acres in PCA	8.5
Riparian Setback Acres in PCA	21.8
Riparian Area Acres in PCA	73.9
Forest Acres in PCA	69.7
Steep Slope Acres in PCA	30.3
Critical Soil Acres in PCA	19.3
Number of Parcels	26.0



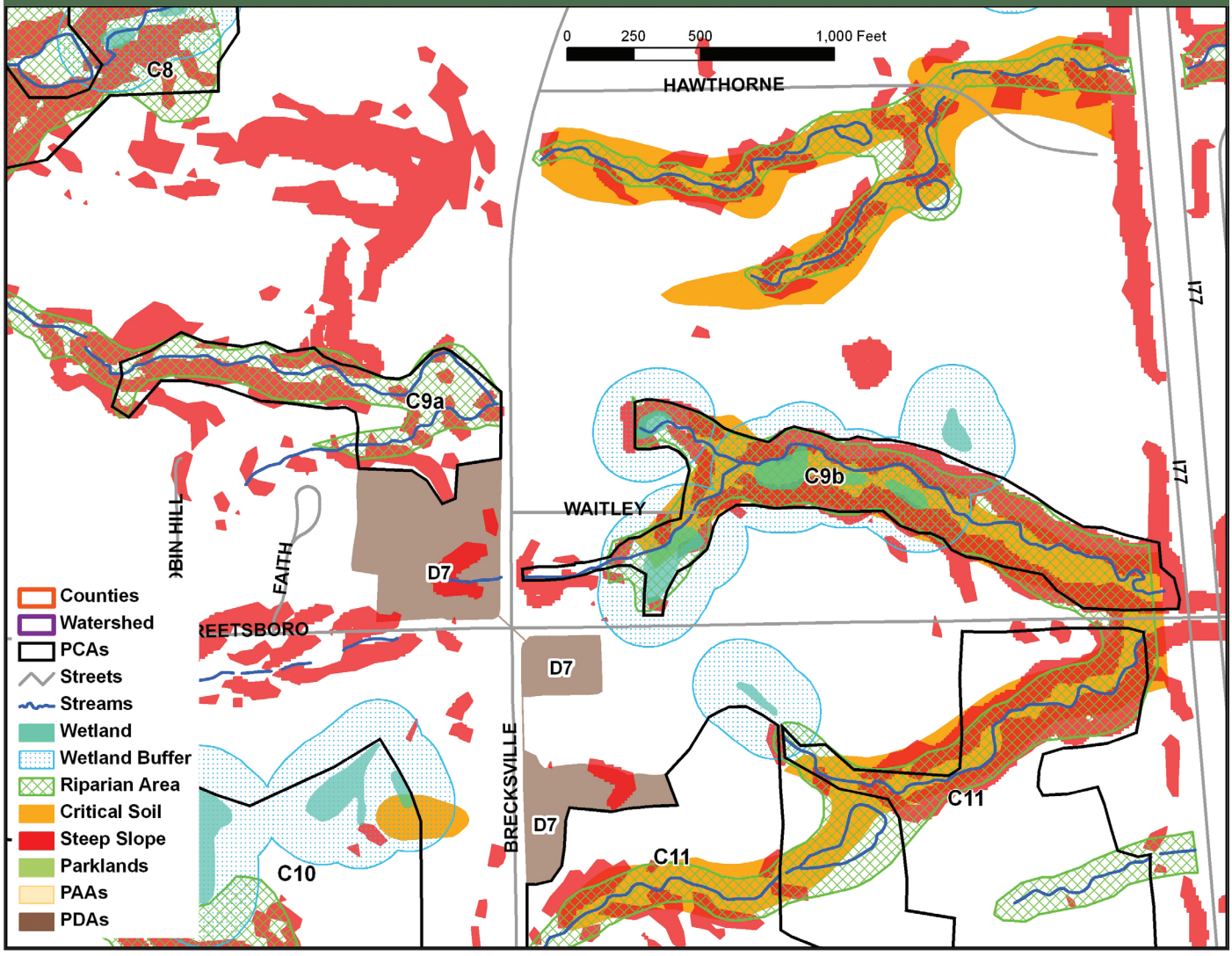
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C9



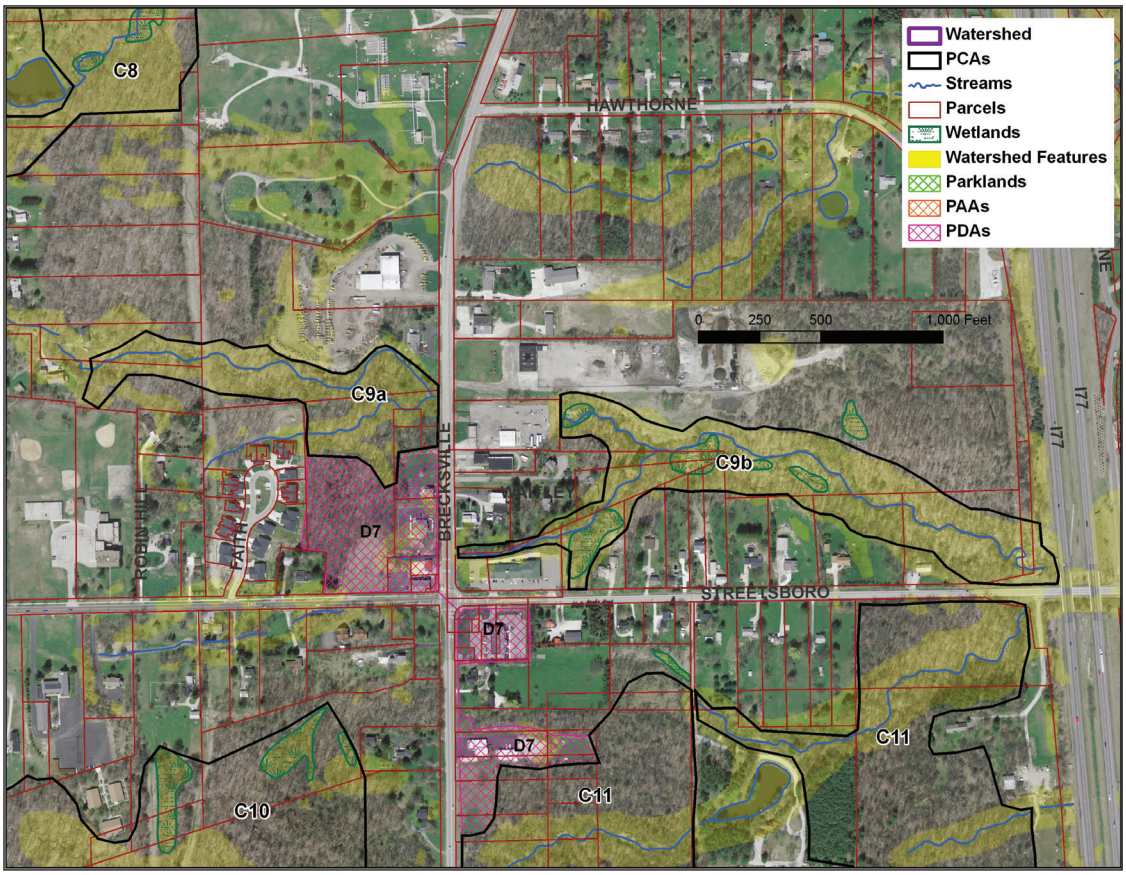
CRITICAL WATERSHED FEATURES

Priority Conservation Area C9

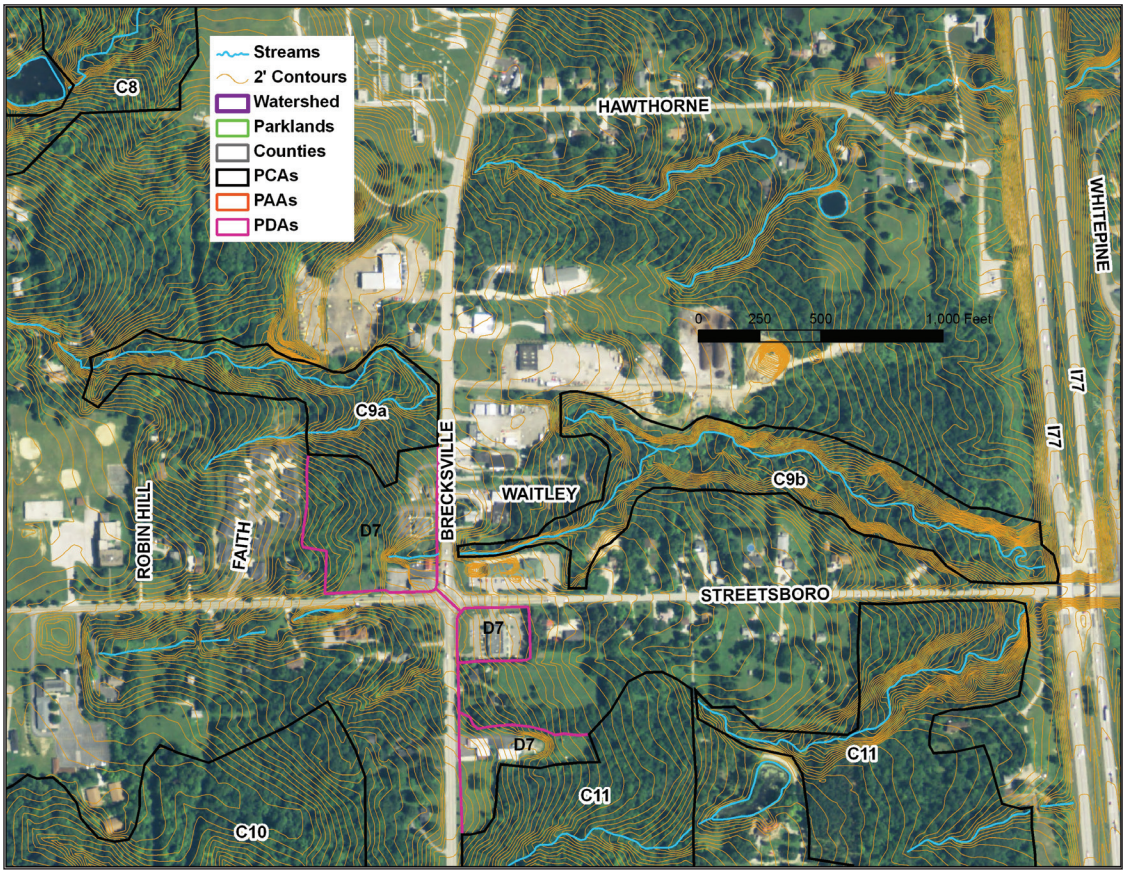
PCA C9 is located in Richfield Village in Summit County. This site is broken into two sections separated by commercial/industrial development. Both sections are north of Streetsboro Road. PCA C9a is between Humphrey and Brecksville Roads and abuts a portion of PDA D7. PCA C9b is between Brecksville and I-77.

PCA C9 has headwater streams flowing through steep sided valleys within forested riparian areas. Additionally, PCA C9b has five wetlands that are downstream from highly impervious areas. Protection of the wetlands is important to maintaining good quality water downstream in the parklands.

Name	C9a	C9b
Acres	8.6	15.2
Wetland Acres in PCA	0.0	1.6
Wetland Buffers Acres in PCA	0.0	7.9
Riparian Setback Acres in PCA	2.6	3.9
Riparian Area Acres in PCA	6.0	13.1
Forest Acres in PCA	7.9	12.8
Steep Slope Acres in PCA	3.5	8.3
Critical Soil Acres in PCA	0.0	9.6
Number of Parcels	7.0	7.0



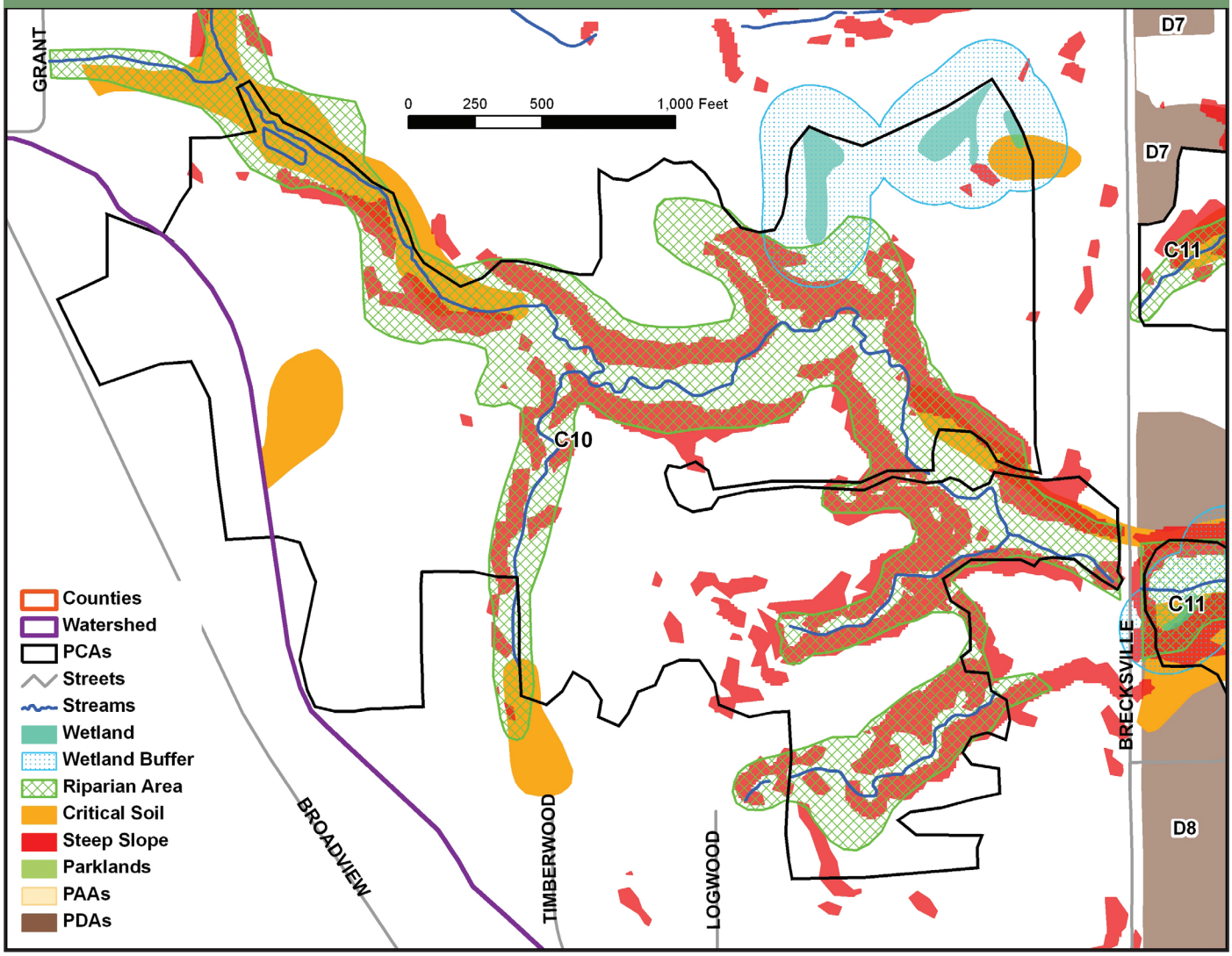
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C10



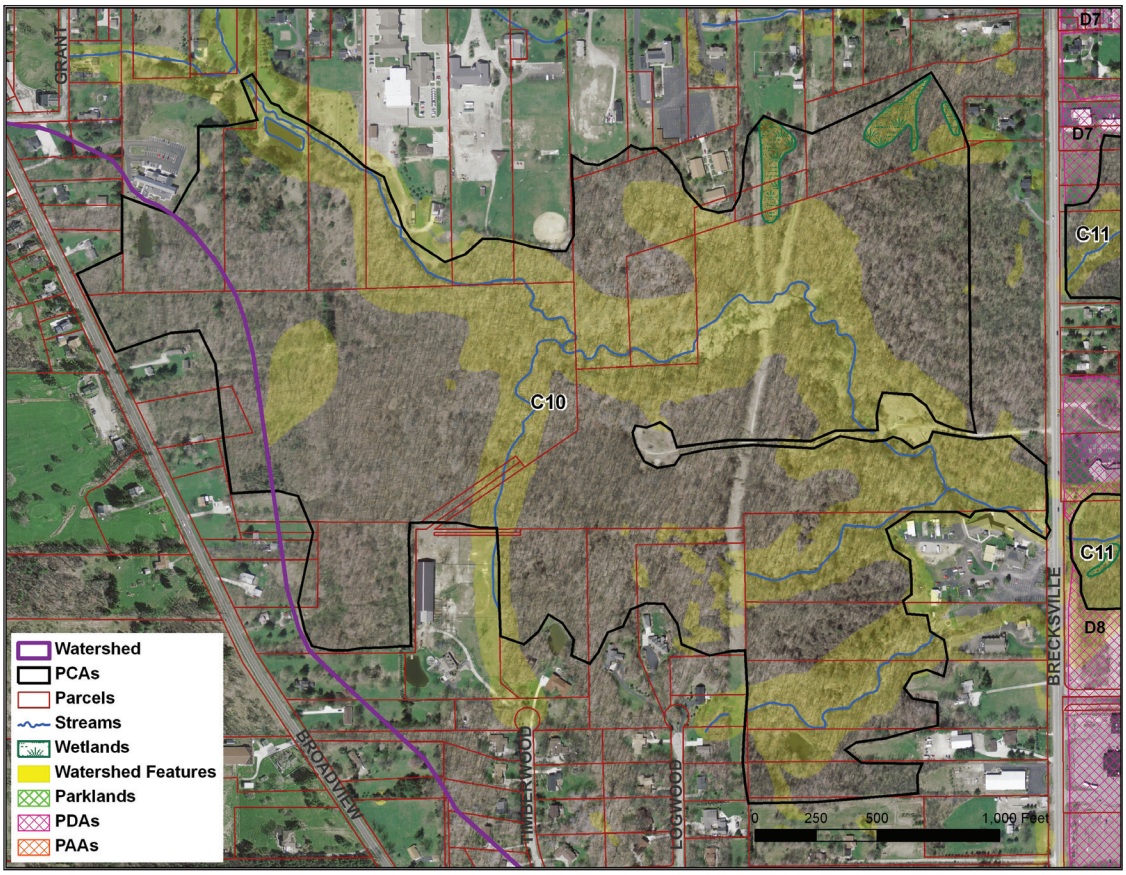
CRITICAL WATERSHED FEATURES

Priority Conservation Area C10

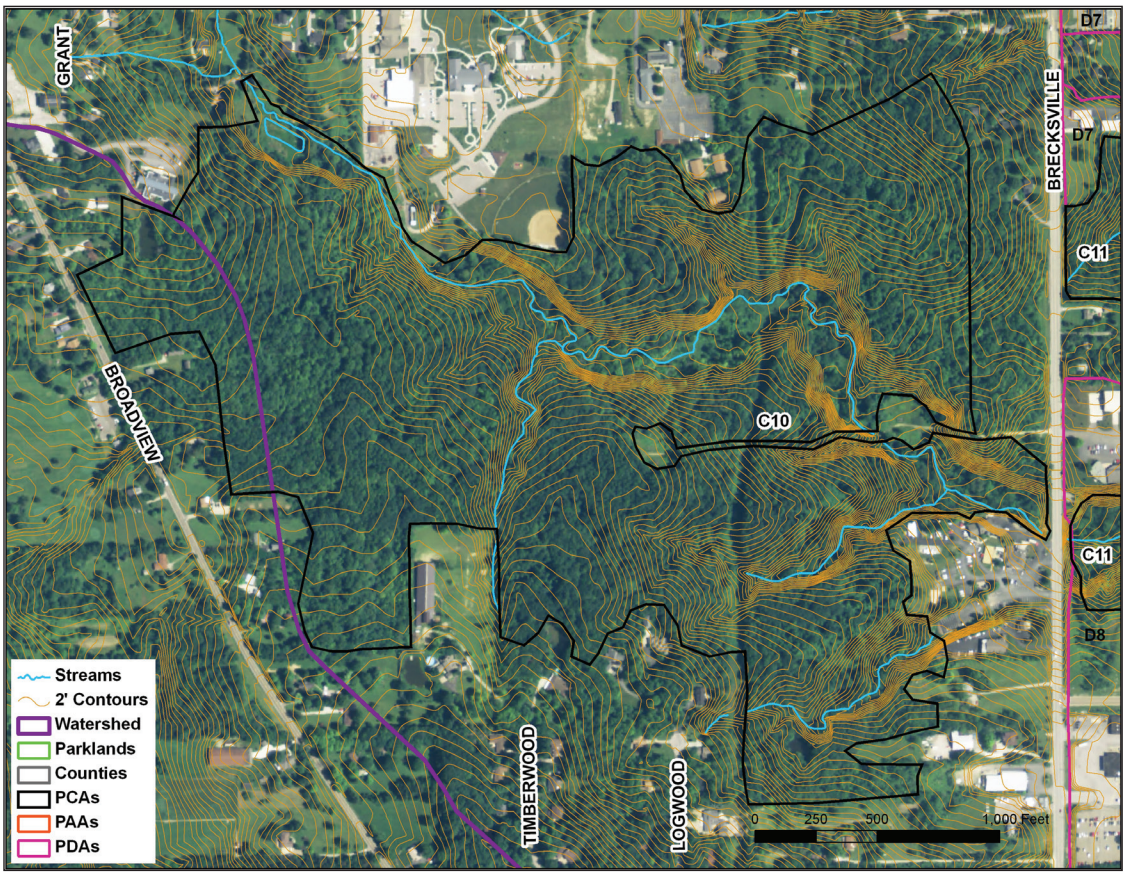
PCA C10 is located in Richfield Village in Summit County. This site is south of Streetsboro Road between Broadview and Brecksville Roads. The Village is the primary owner and the municipal building complex is just north of the site.

PCA C10 is in the west central portion of the watershed. It is characterized by dense forest cover and steeply sloped headwater stream valleys. Based on the contour lines and the 2010 aerial there are probably additional headwater streams that need to be mapped.

Name	C10
Acres	143.0
Wetland Acres in PCA	1.7
Wetland Buffers Acres in PCA	6.8
Riparian Setback Acres in PCA	9.6
Riparian Area Acres in PCA	48.1
Forest Acres in PCA	127.8
Steep Slope Acres in PCA	25.9
Critical Soil Acres in PCA	8.0
Number of Parcels	19.0



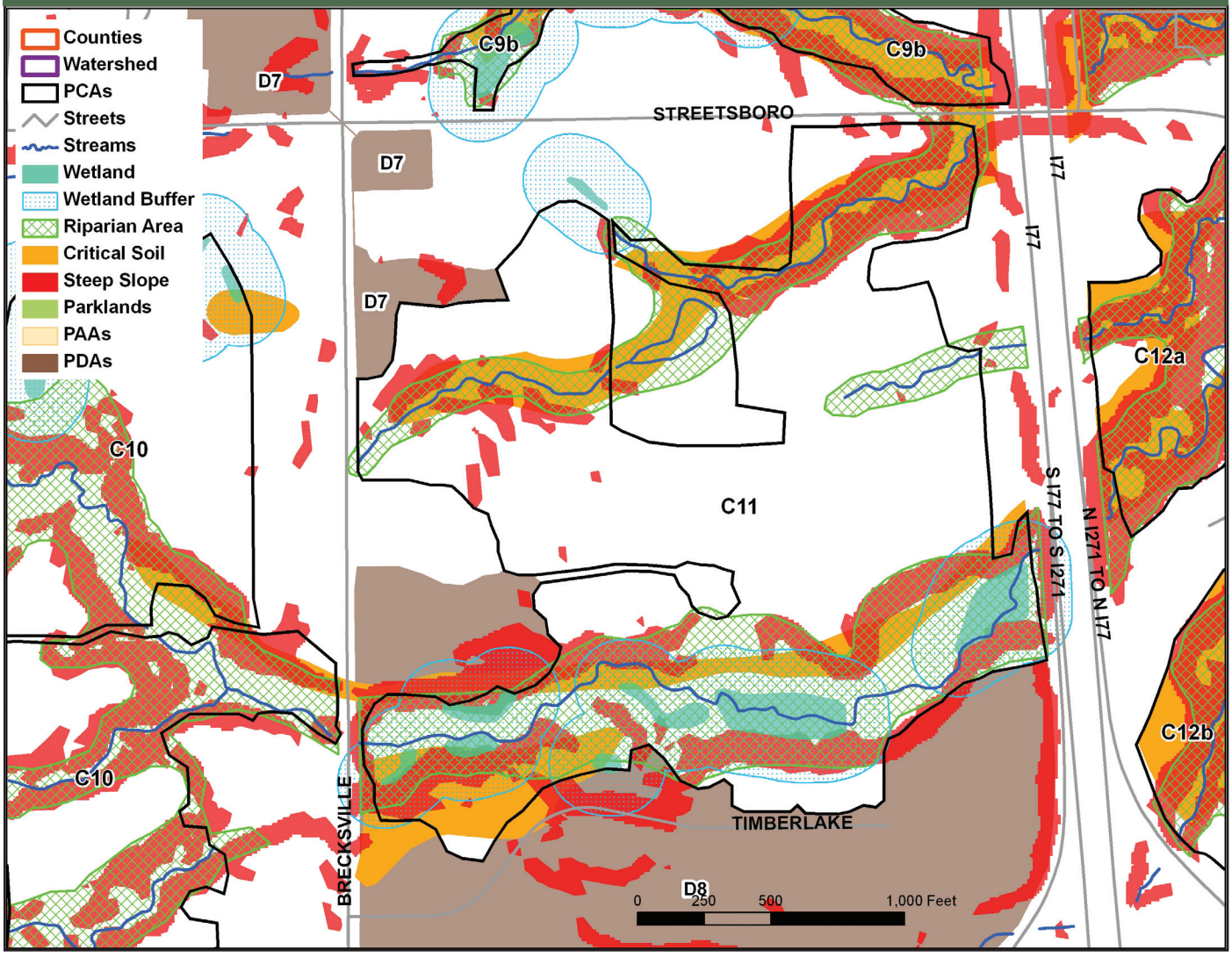
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C11



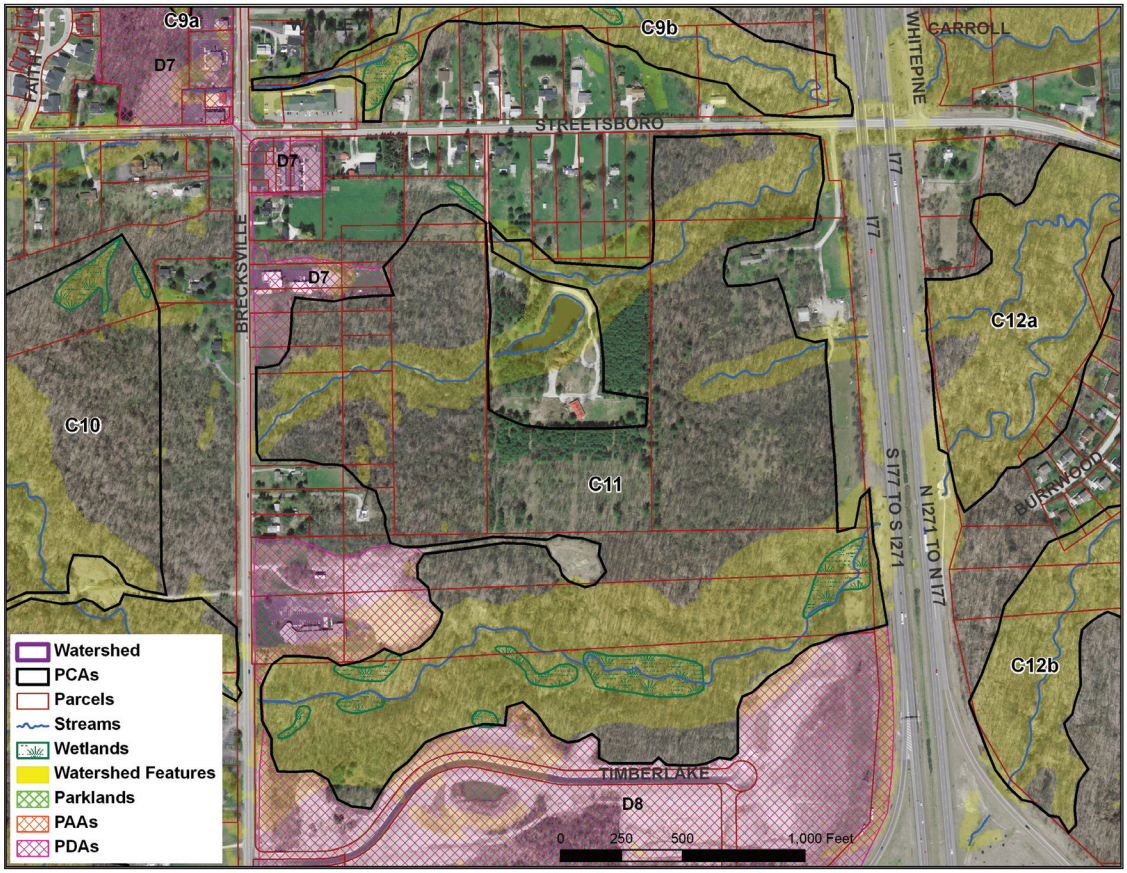
CRITICAL WATERSHED FEATURES

Priority Conservation Area C11

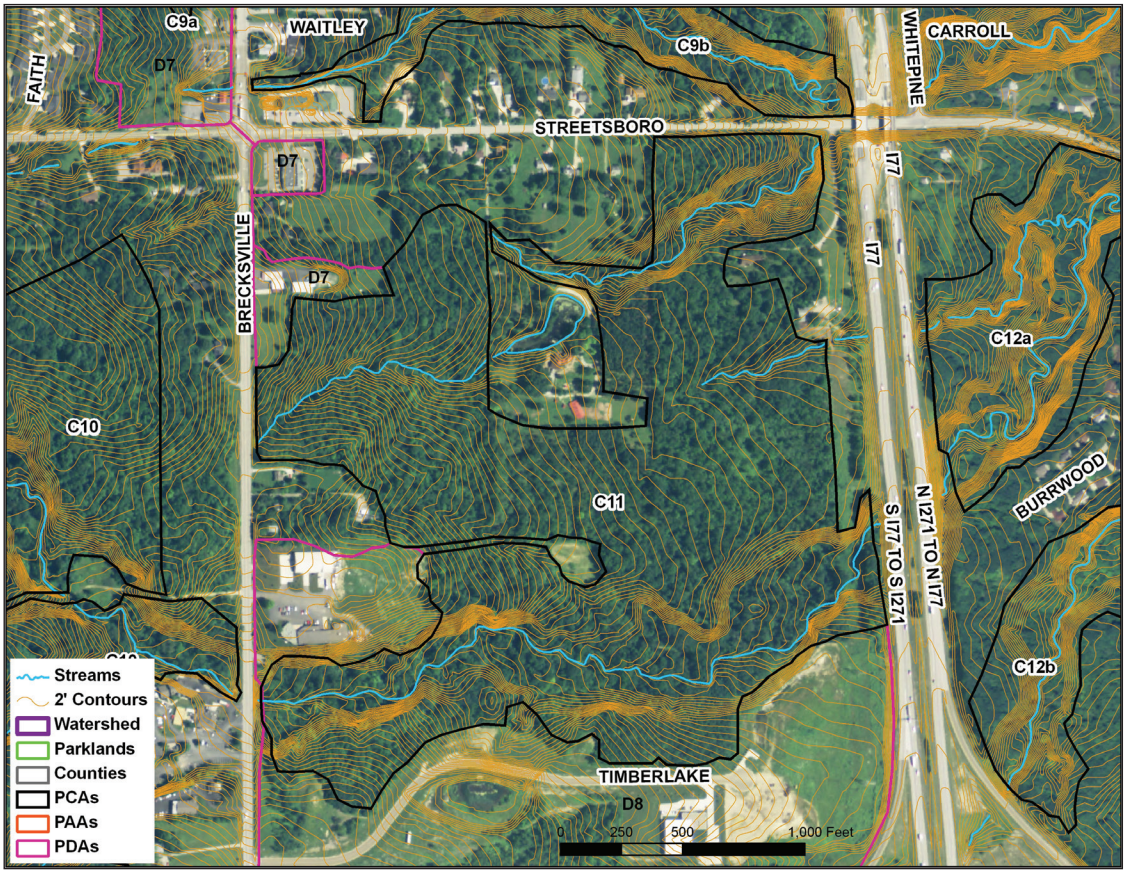
PCA C11 is located in Richfield Village in Summit County. This site is south of Streetsboro Road, between Brecksville and I-77, and due east of PCA C10.

PCA C11 is south of the center of the watershed. It has two streams flowing east to west within steep sided valleys and forested riparian areas. The southern valley contains seven small wetlands and their buffers. The forest between the valleys may contain unmapped headwater streams.

Name	C11
Acres	93.3
Wetland Acres in PCA	4.0
Wetland Buffers Acres in PCA	20.1
Riparian Setback Acres in PCA	15.3
Riparian Area Acres in PCA	38.0
Forest Acres in PCA	88.8
Steep Slope Acres in PCA	19.0
Critical Soil Acres in PCA	17.5
Number of Parcels	18.0



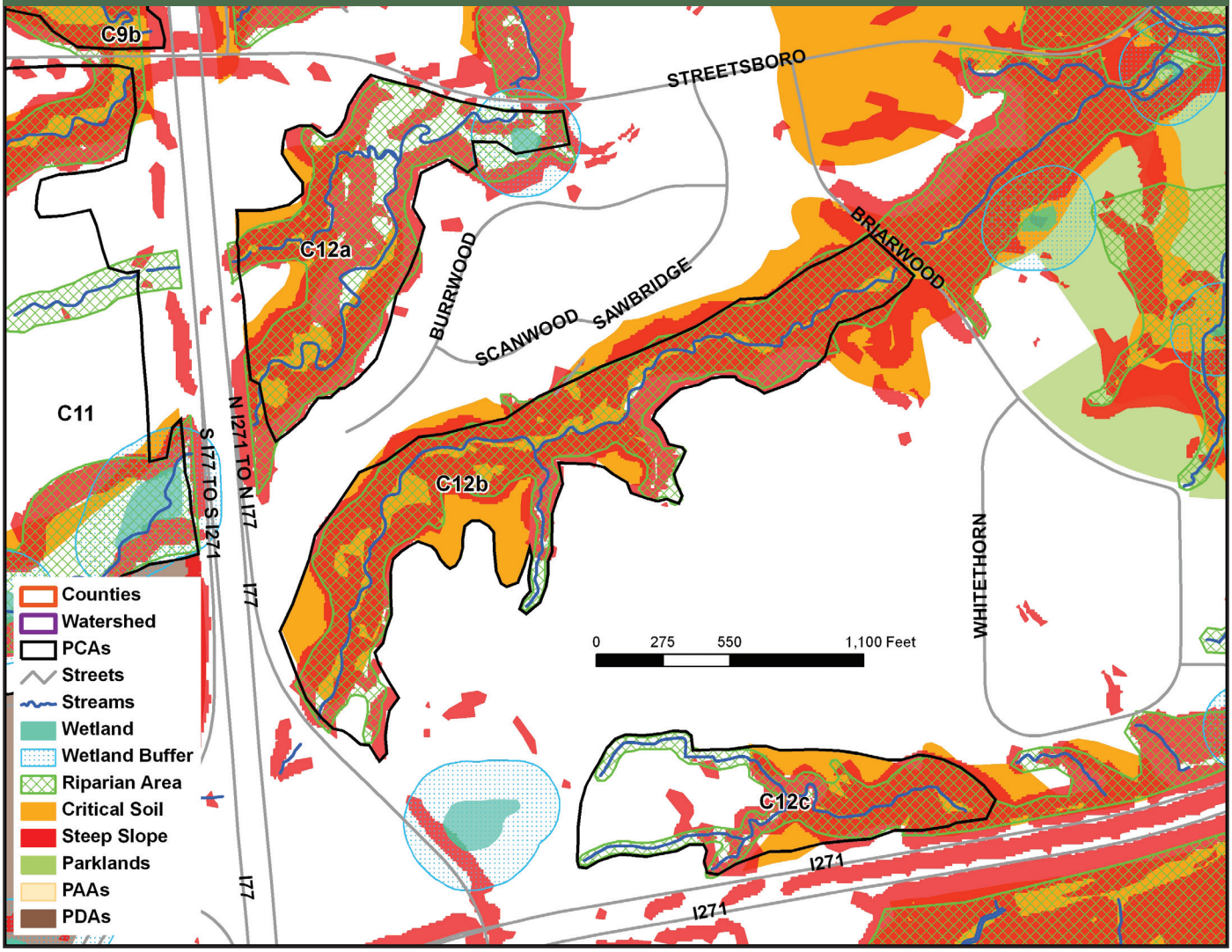
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C12



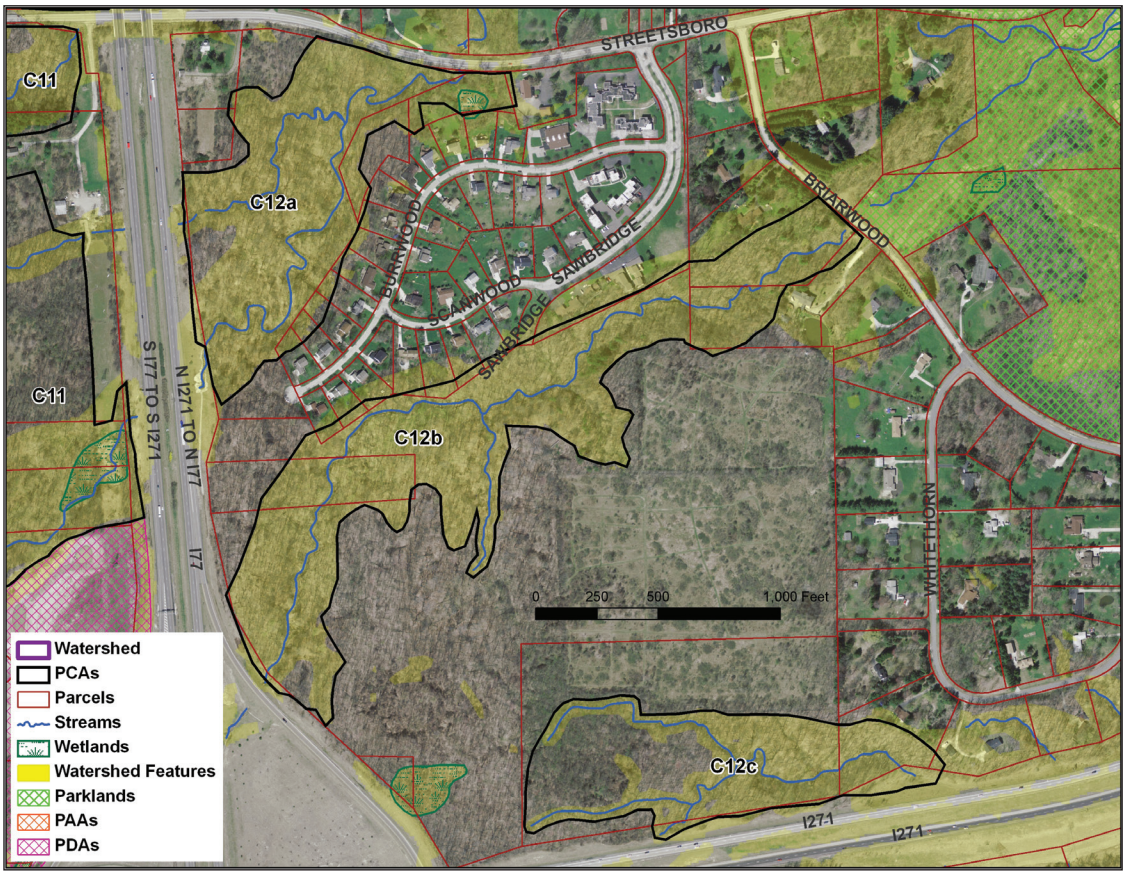
CRITICAL WATERSHED FEATURES

Priority Conservation Area C12

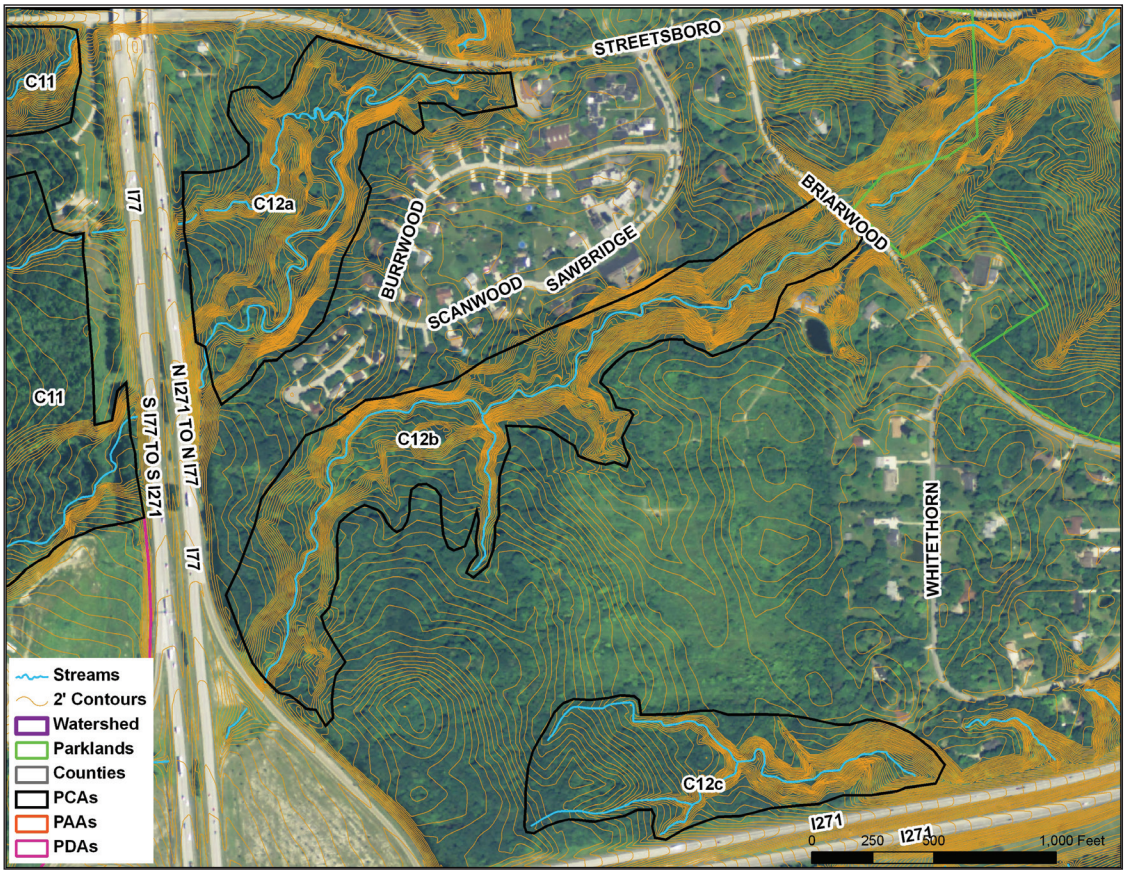
PCA C12 is located in both Richfield Village and Township in Summit County. This site is east of I-77 between Streetsboro Road and I-271.

PCA C12 is due east of PCA C11. It has three separate headwater stream areas with similar characteristics: steep sided valleys with wooded riparian areas.

Name	C12a	C12b	C12c
Acres	19.5	29.1	15.0
Wetland Acres in PCA	0.2	0.0	0.0
Wetland Buffers Acres in PCA	1.1	0.0	0.0
Riparian Setback Acres in PCA	10.2	5.2	3.7
Riparian Area Acres in PCA	15.8	21.8	7.5
Forest Acres in PCA	19.2	28.7	14.7
Steep Slope Acres in PCA	11.5	19.6	6.1
Critical Soil Acres in PCA	8.0	22.5	5.6
Number of Parcels	3.0	4.0	2.0



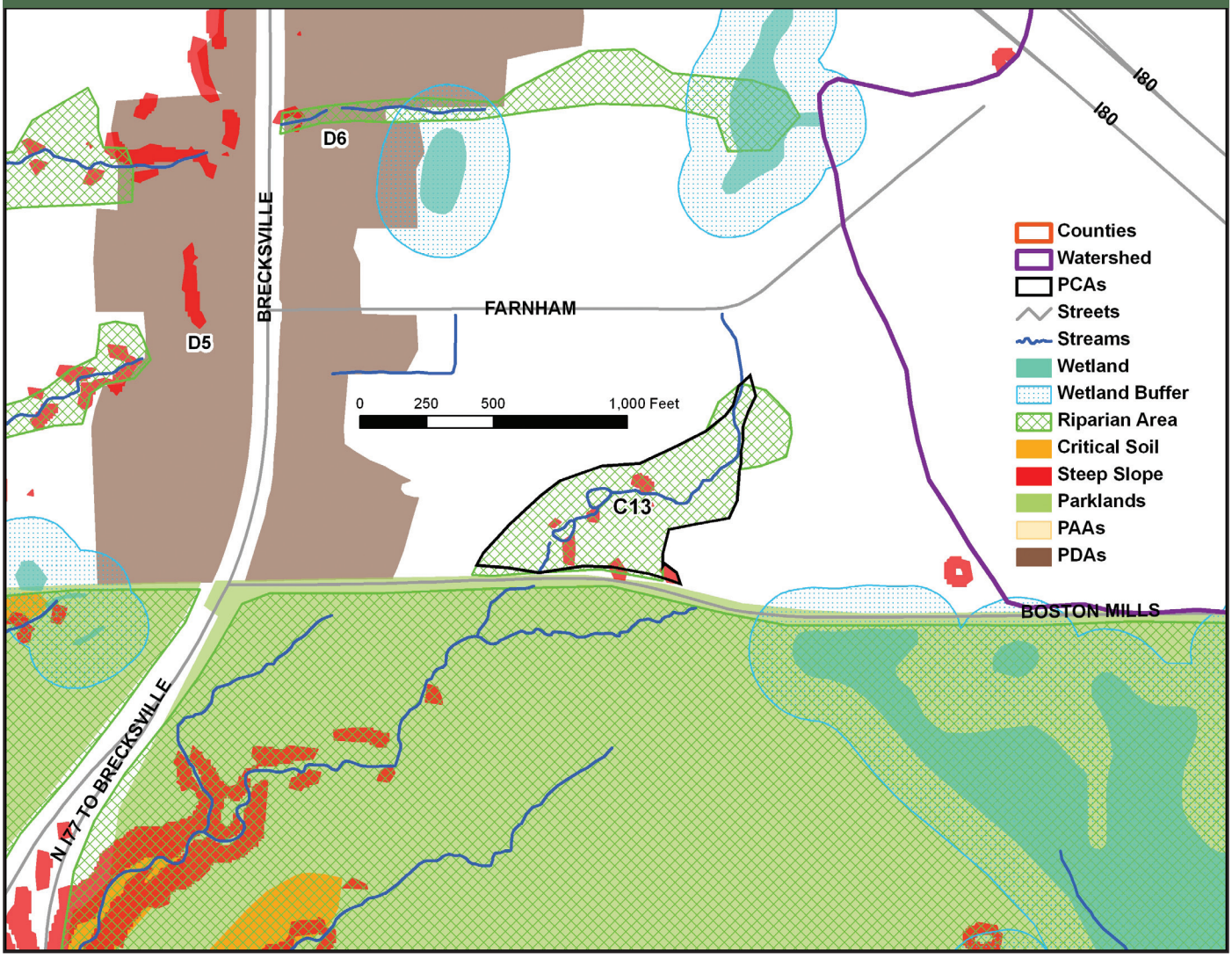
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C13



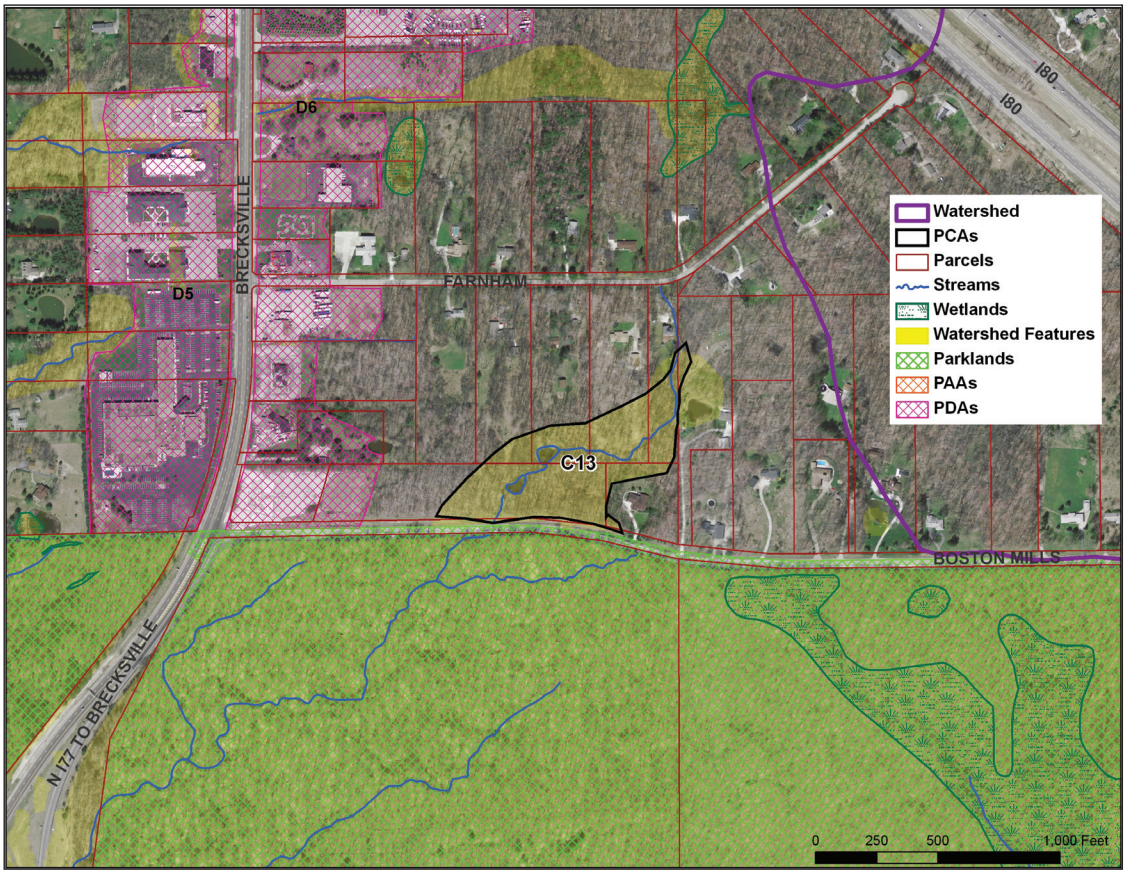
CRITICAL WATERSHED FEATURES

Priority Conservation Area C13

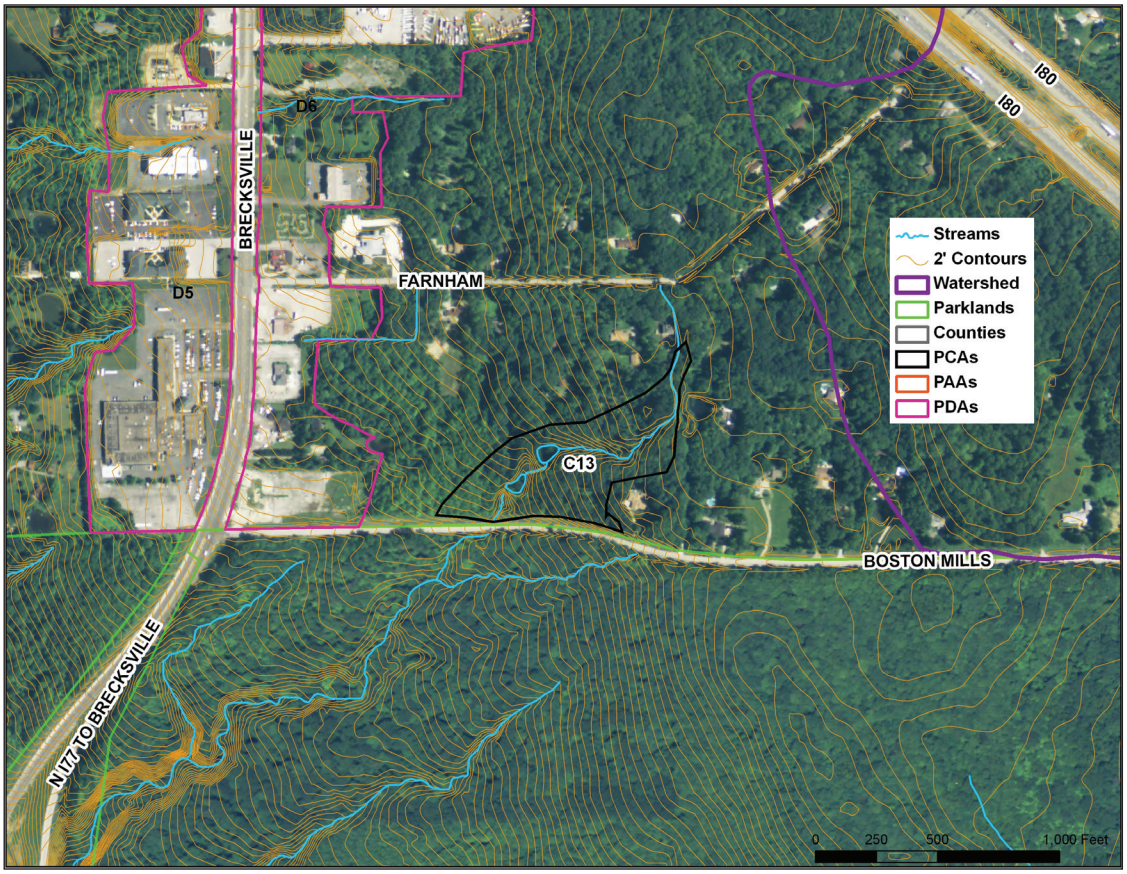
PCA C13 is located in both Richfield Village and Township in Summit County. It is east of Brecksville Road along the north side of Boston Mills Road.

PCA C13 is in the east central portion of the watershed. It has a headwater stream with a forested riparian area adjacent to the Cuyahoga Valley National Park.

Name	C13
Acres	7.3
Wetland Acres in PCA	0.0
Wetland Buffers Acres in PCA	0.0
Riparian Setback Acres in PCA	1.7
Riparian Area Acres in PCA	7.2
Forest Acres in PCA	6.4
Steep Slope Acres in PCA	0.3
Critical Soil Acres in PCA	0
Number of Parcels	6



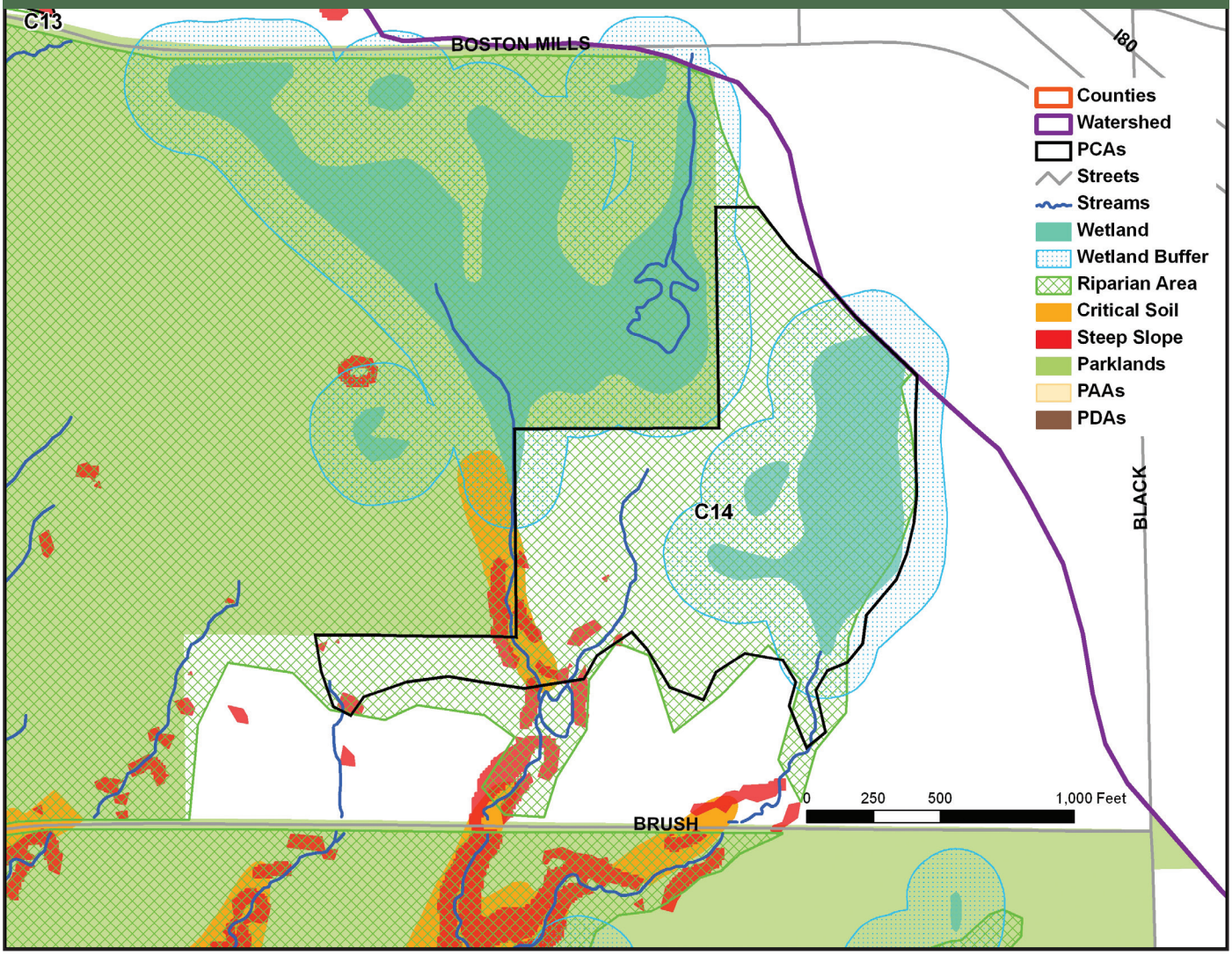
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C14



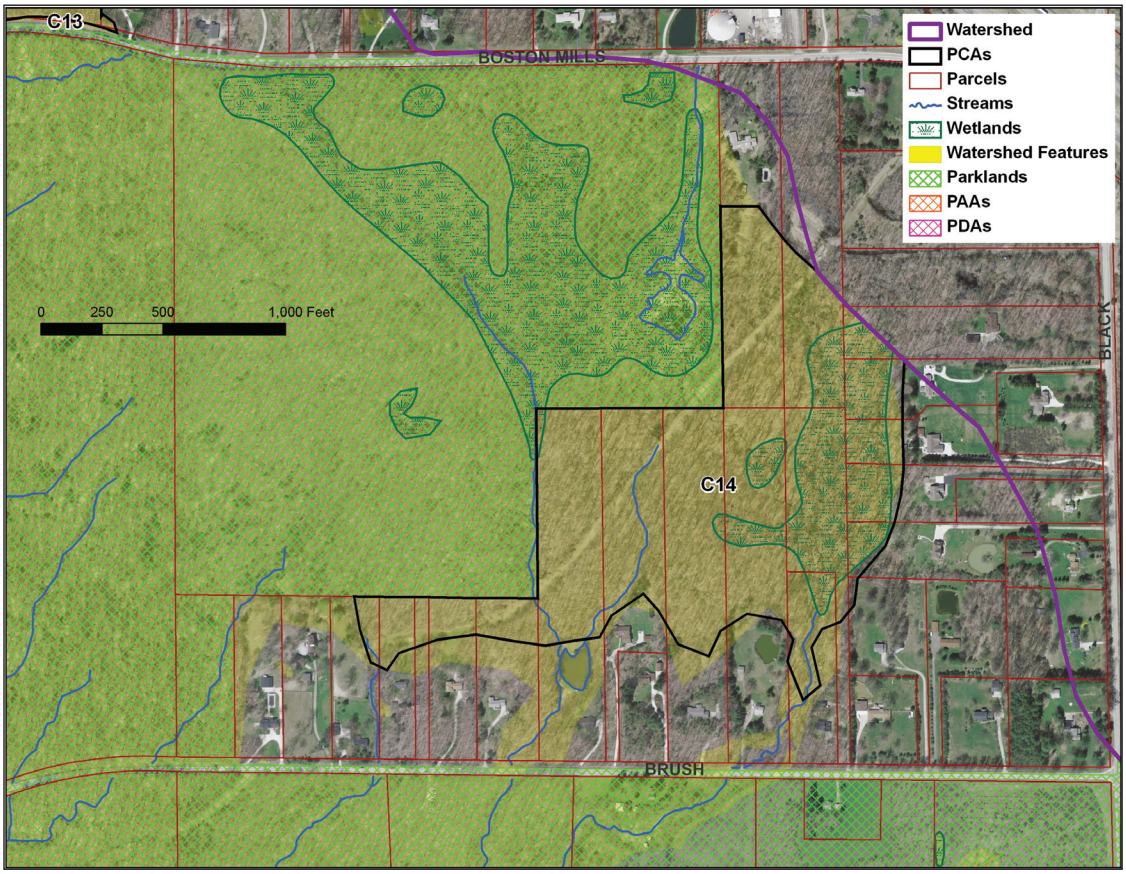
CRITICAL WATERSHED FEATURES

Priority Conservation Area C14

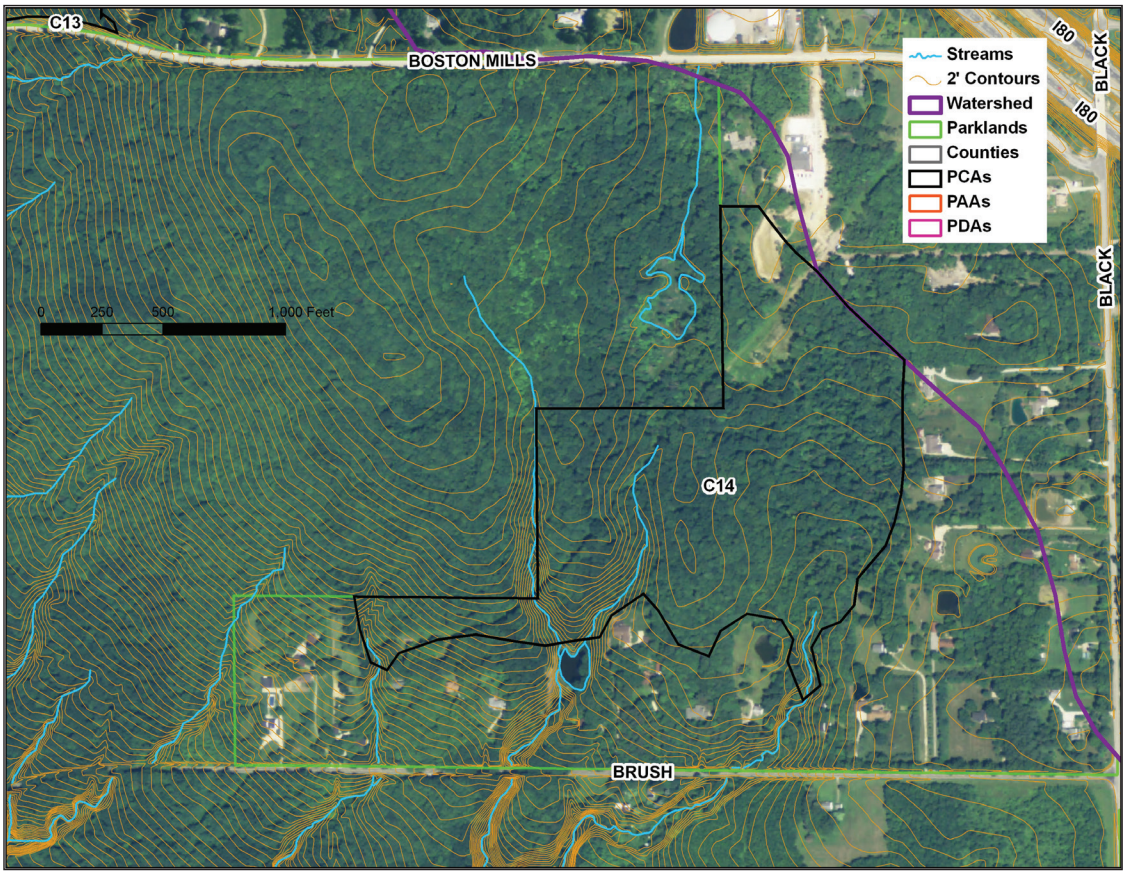
PCA C14 is located in Richfield Township in Summit County. This site is west of Black Road between Boston Mills and Brush Roads.

PCA C14 is on the eastern edge of the watershed. It has large forested wetland, a headwater stream, a forested riparian area and is adjacent to the Cuyahoga Valley National Park.

Name	C14
Acres	42.9
Wetland Acres in PCA	9.4
Wetland Buffers Acres in PCA	13.6
Riparian Setback Acres in PCA	2.2
Riparian Area Acres in PCA	42.0
Forest Acres in PCA	40.6
Steep Slope Acres in PCA	0.7
Critical Soil Acres in PCA	1.0
Number of Parcels	18.0



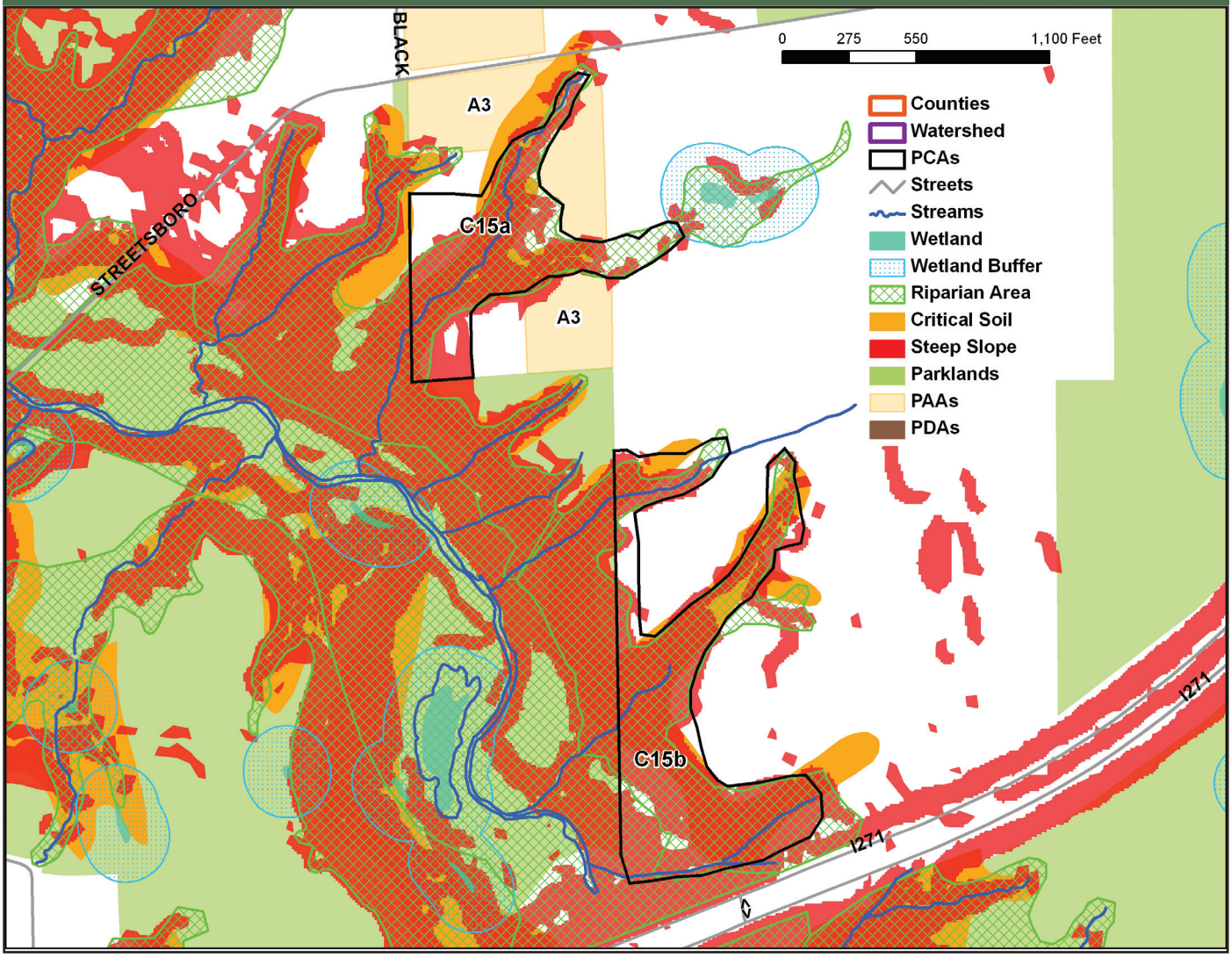
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C15



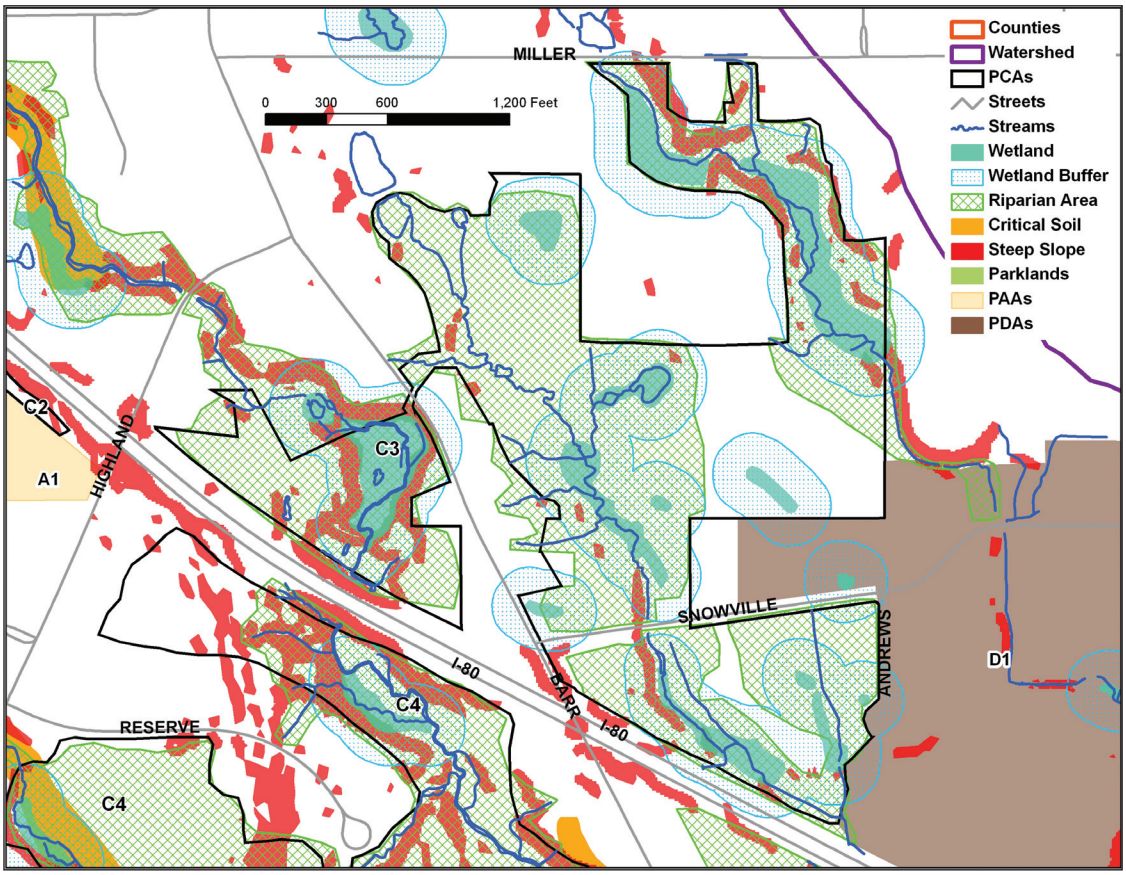
CRITICAL WATERSHED FEATURES

Priority Conservation Area C15

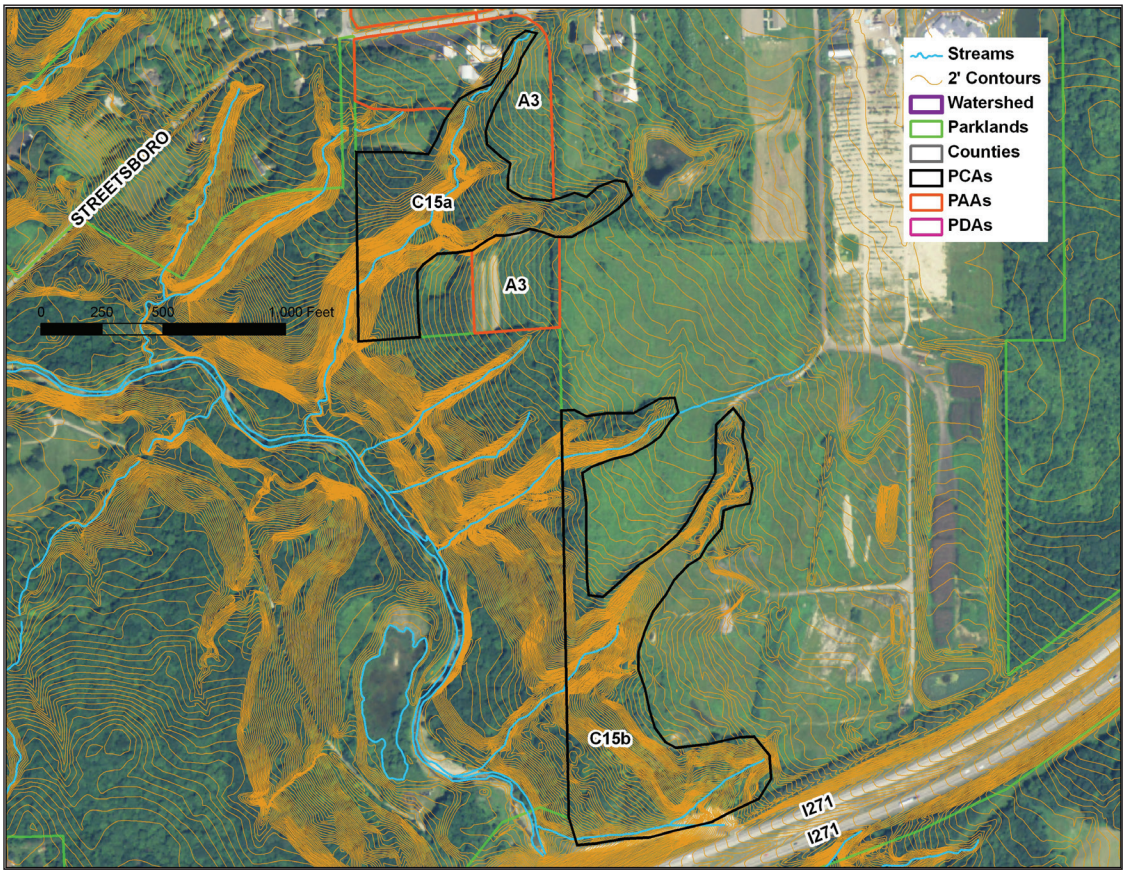
PCA C15 is located in Richfield Township in Summit County. This site is south of Streetsboro Road and west of the I-271 intersection. PCA C15a is adjacent to PAA A3.

PCA C15 is on the eastern edge of the watershed. It has two similar sections characterized by headwater streams in very narrow steep-sided valleys and forested riparian areas. Both sections are adjacent to the Cuyahoga Valley National Park.

Name	C15a	C15b
Acres	10.8	17.0
Wetland Acres in PCA	0.0	0.0
Wetland Buffers Acres in PCA	0.0	0.0
Riparian Setback Acres in PCA	1.5	2.1
Riparian Area Acres in PCA	8.2	14.2
Forest Acres in PCA	10.5	12.3
Steep Slope Acres in PCA	7.4	13.8
Critical Soil Acres in PCA	5.0	9.1
Number of Parcels	2.0	1.0



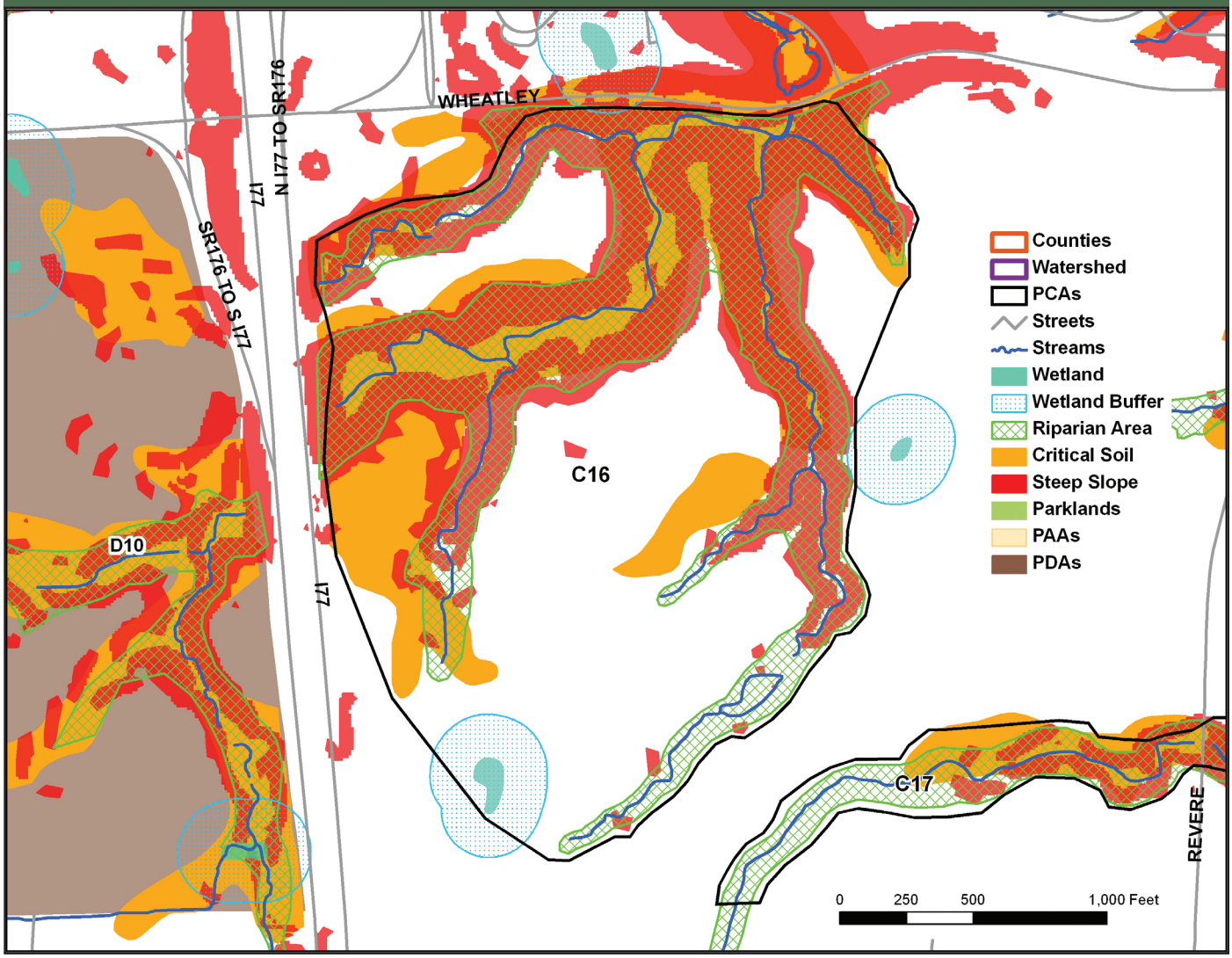
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C16



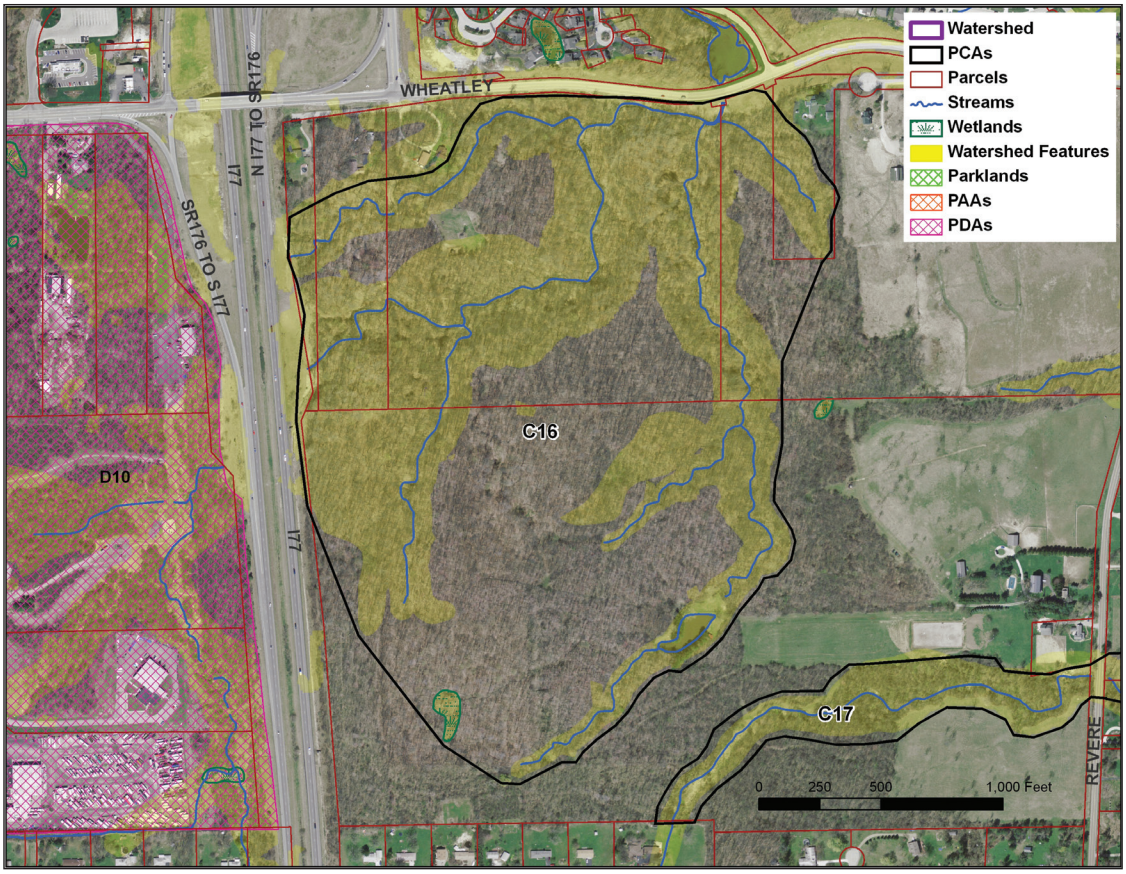
CRITICAL WATERSHED FEATURES

Priority Conservation Area C16

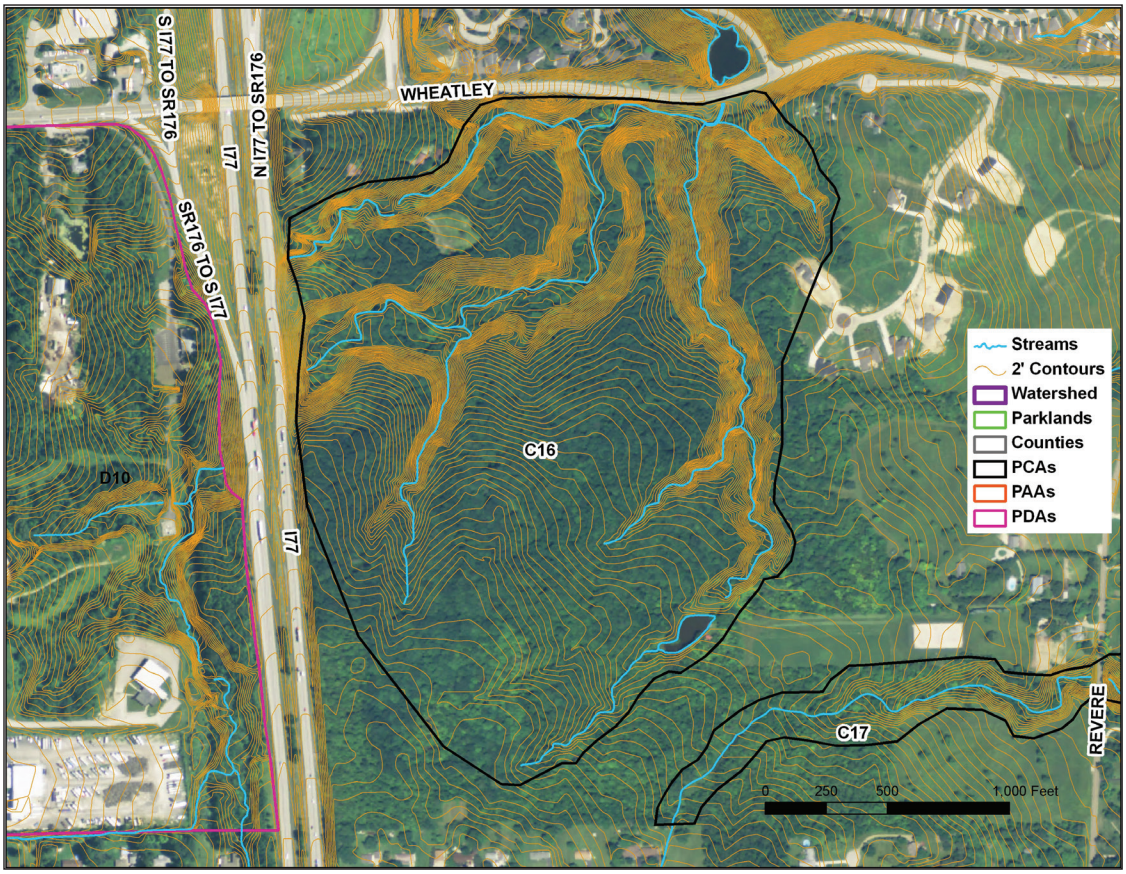
PCA C16 is located in Richfield Village in Summit County. This site is south of Wheatley Road at I-77.

PCA C16 is in the southern portion of the watershed. It has four steep-sided valleys with tributary stream and forested riparian areas. In the forest between the valleys there are most probably unmapped headwater streams.

Name	C16
Acres	107.2
Wetland Acres in PCA	0.3
Wetland Buffers Acres in PCA	2.9
Riparian Setback Acres in PCA	14.0
Riparian Area Acres in PCA	44.3
Forest Acres in PCA	103.5
Steep Slope Acres in PCA	37.7
Critical Soil Acres in PCA	40.9
Number of Parcels	6.0



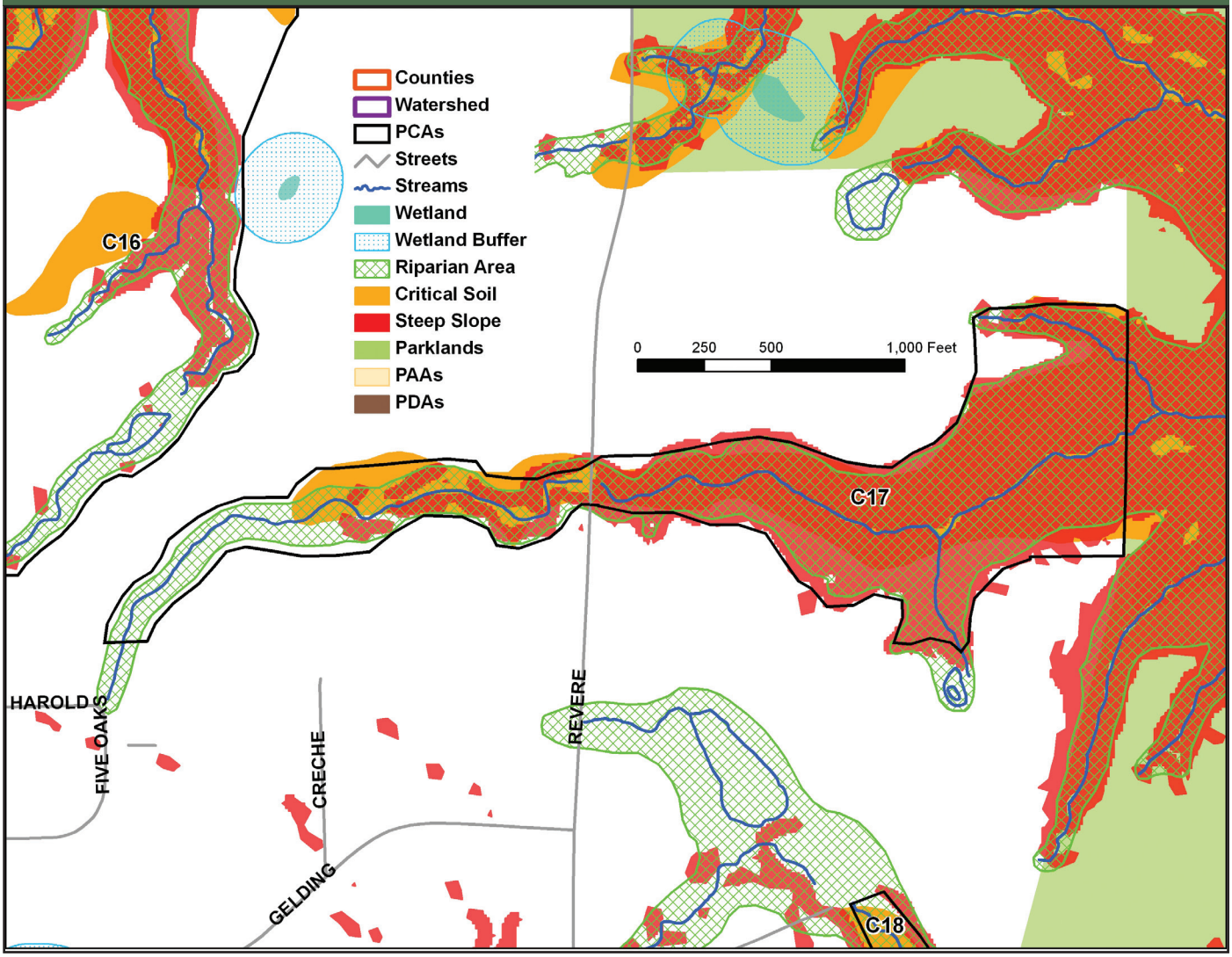
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C17



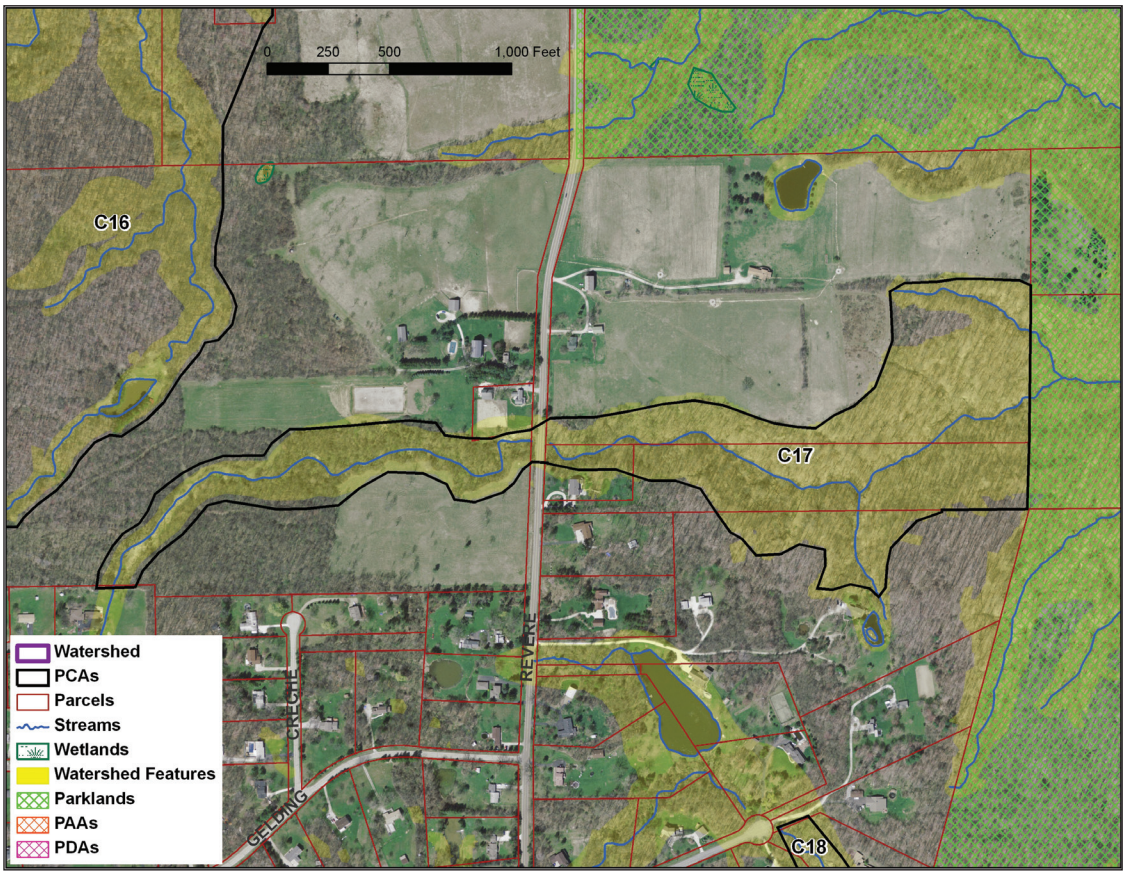
CRITICAL WATERSHED FEATURES

Priority Conservation Area C17

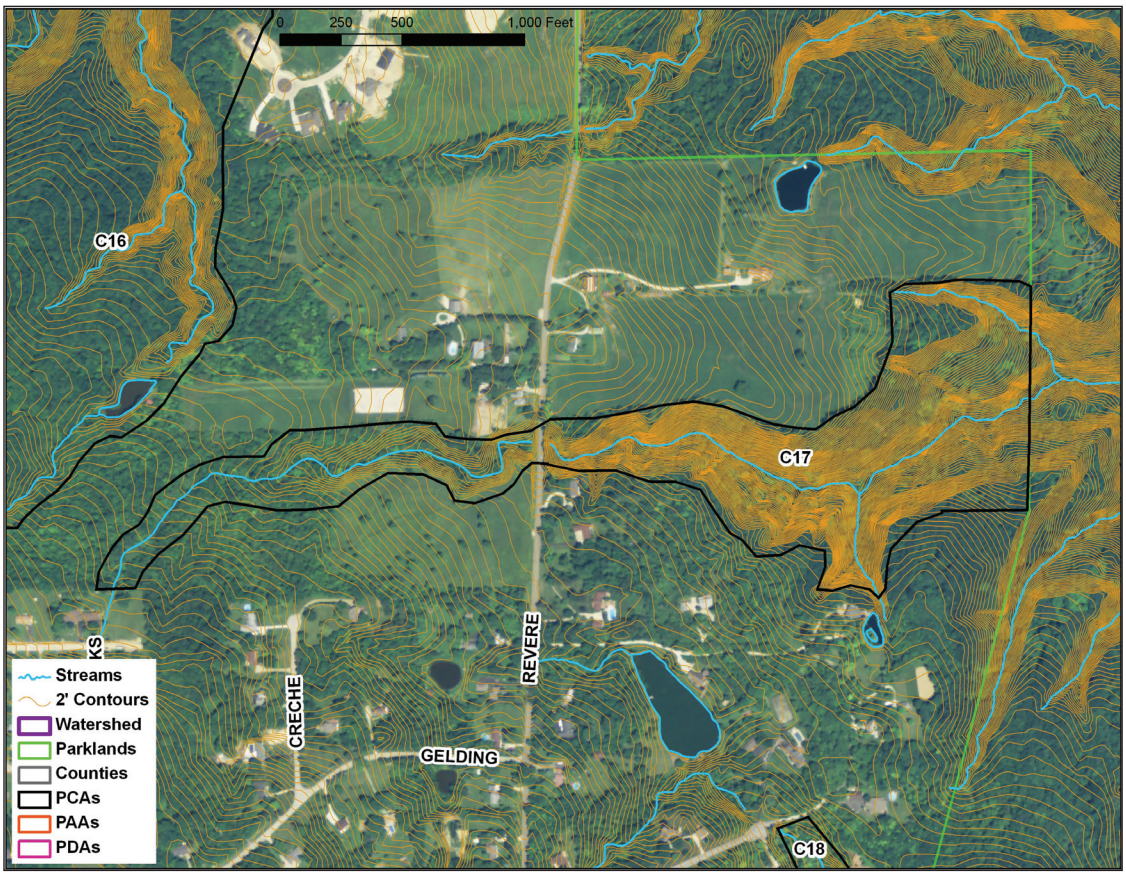
PCA C17 is located in both Richfield Village and Township in Summit County. This site is south of Wheatley and straddles both sides of Revere Road.

PCA C17 is in the southern portion of the watershed. It has a large, deep, steep-sided valley with headwater streams and forested riparian areas. It is adjacent to the west side of Cuyahoga Valley National Park.

Name	C17
Acres	36.8
Wetland Acres in PCA	0.0
Wetland Buffers Acres in PCA	0.0
Riparian Setback Acres in PCA	6.4
Riparian Area Acres in PCA	29.9
Forest Acres in PCA	35.9
Steep Slope Acres in PCA	26.6
Critical Soil Acres in PCA	22.2
Number of Parcels	5



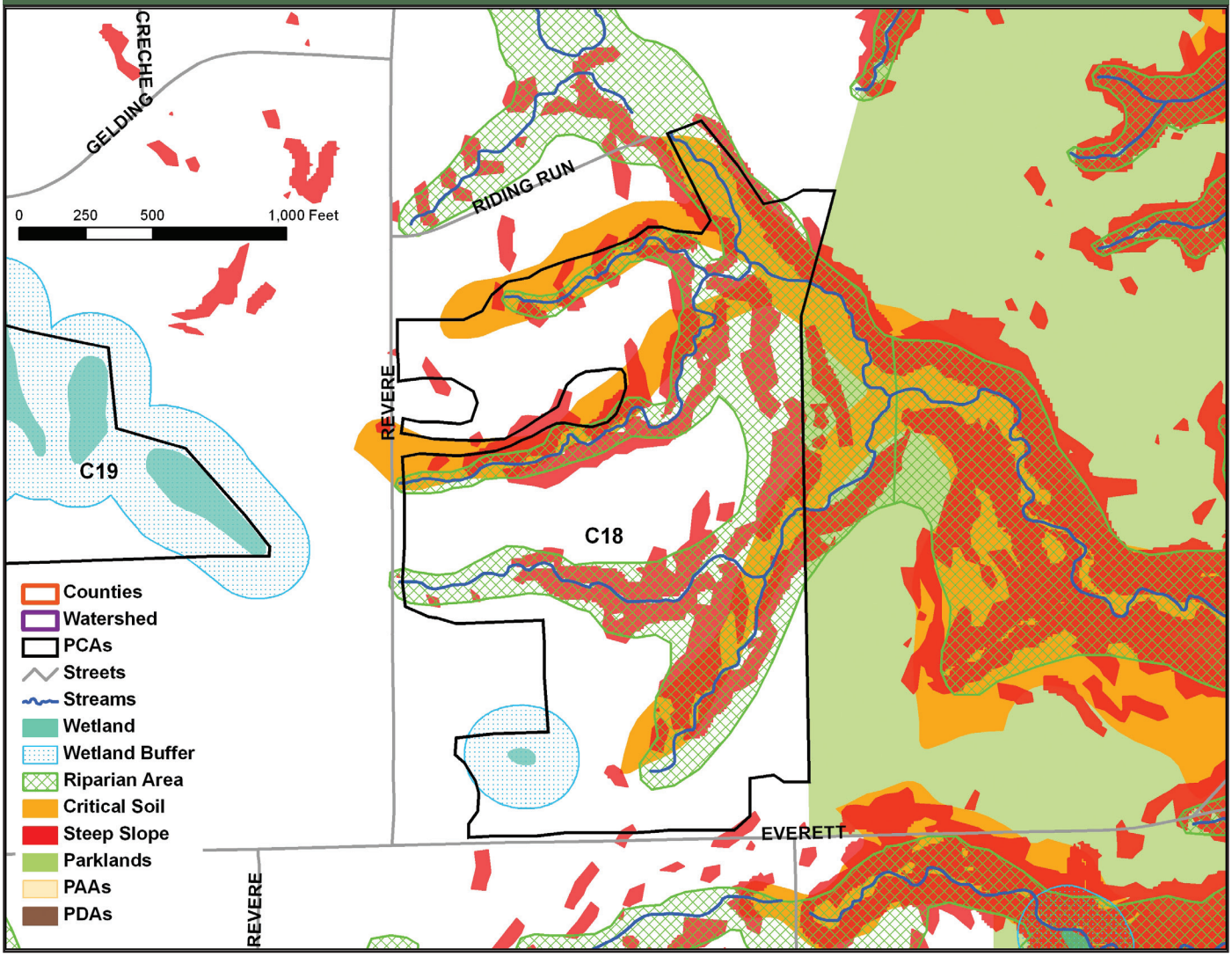
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C18



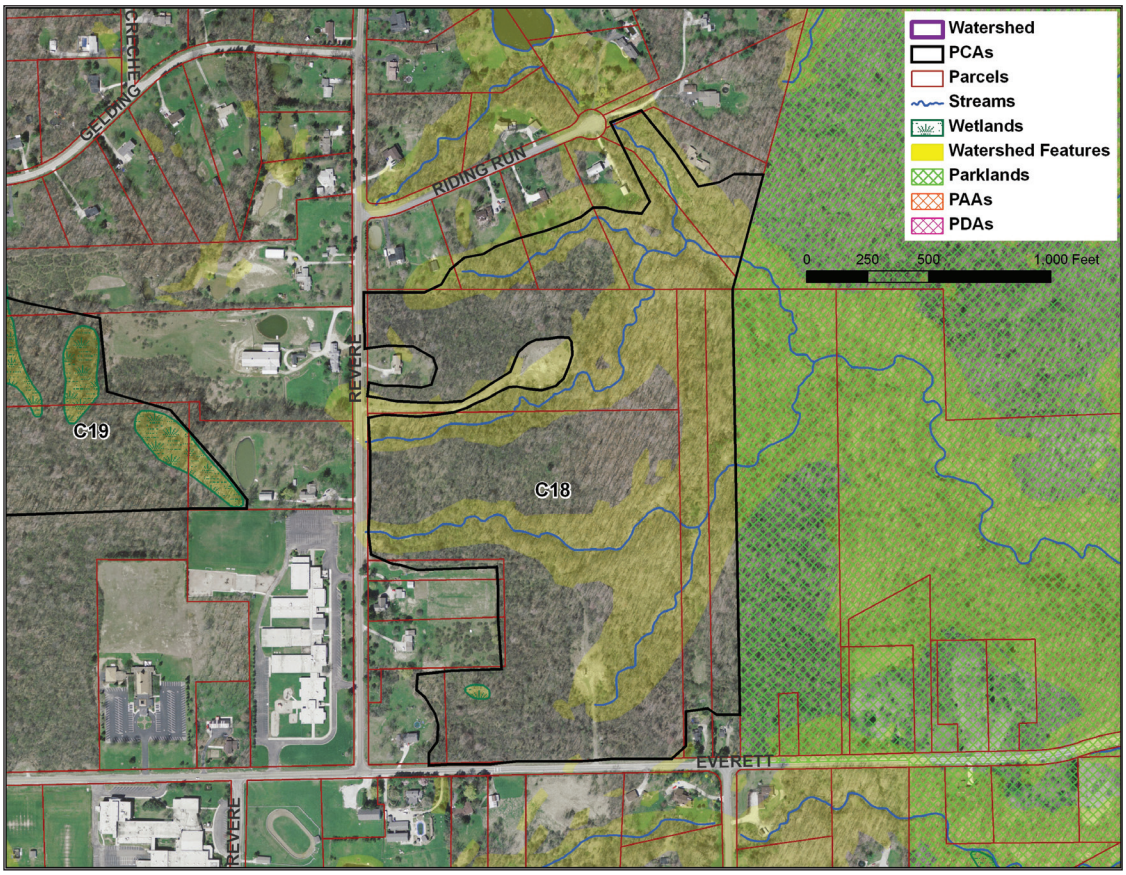
CRITICAL WATERSHED FEATURES

Priority Conservation Area C18

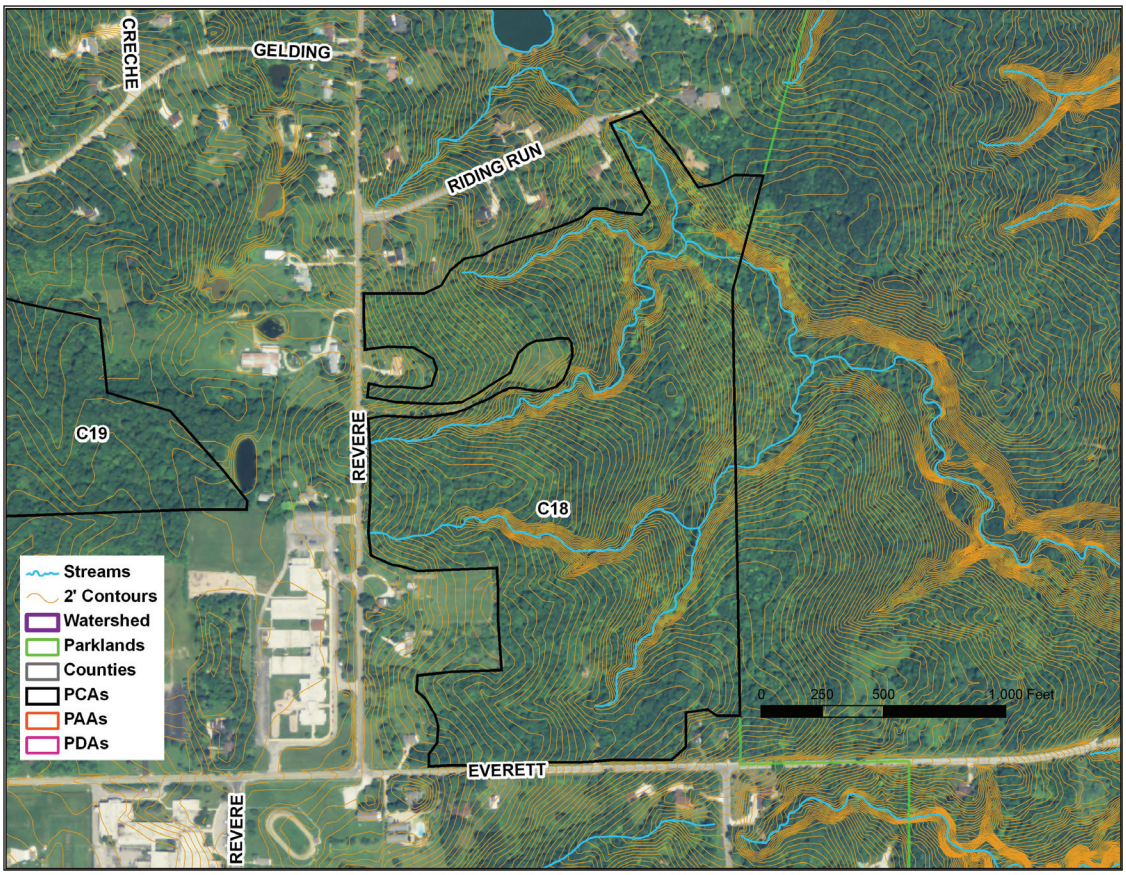
PCA C18 is located in Richfield Township in Summit County. This site is north of Everett Road and east of Revere Road.

PCA C18 is in the southern portion of the watershed. It is characterized by several steep-sided valleys with headwater streams and forested riparian areas. It may have additional unmapped headwater streams. This site is adjacent to the west side of Cuyahoga Valley National Park.

Name	C18
Acres	65.8
Wetland Acres in PCA	0.1
Wetland Buffers Acres in PCA	2.3
Riparian Setback Acres in PCA	7.7
Riparian Area Acres in PCA	28.1
Forest Acres in PCA	61.2
Steep Slope Acres in PCA	16.0
Critical Soil Acres in PCA	13.8
Number of Parcels	8.0



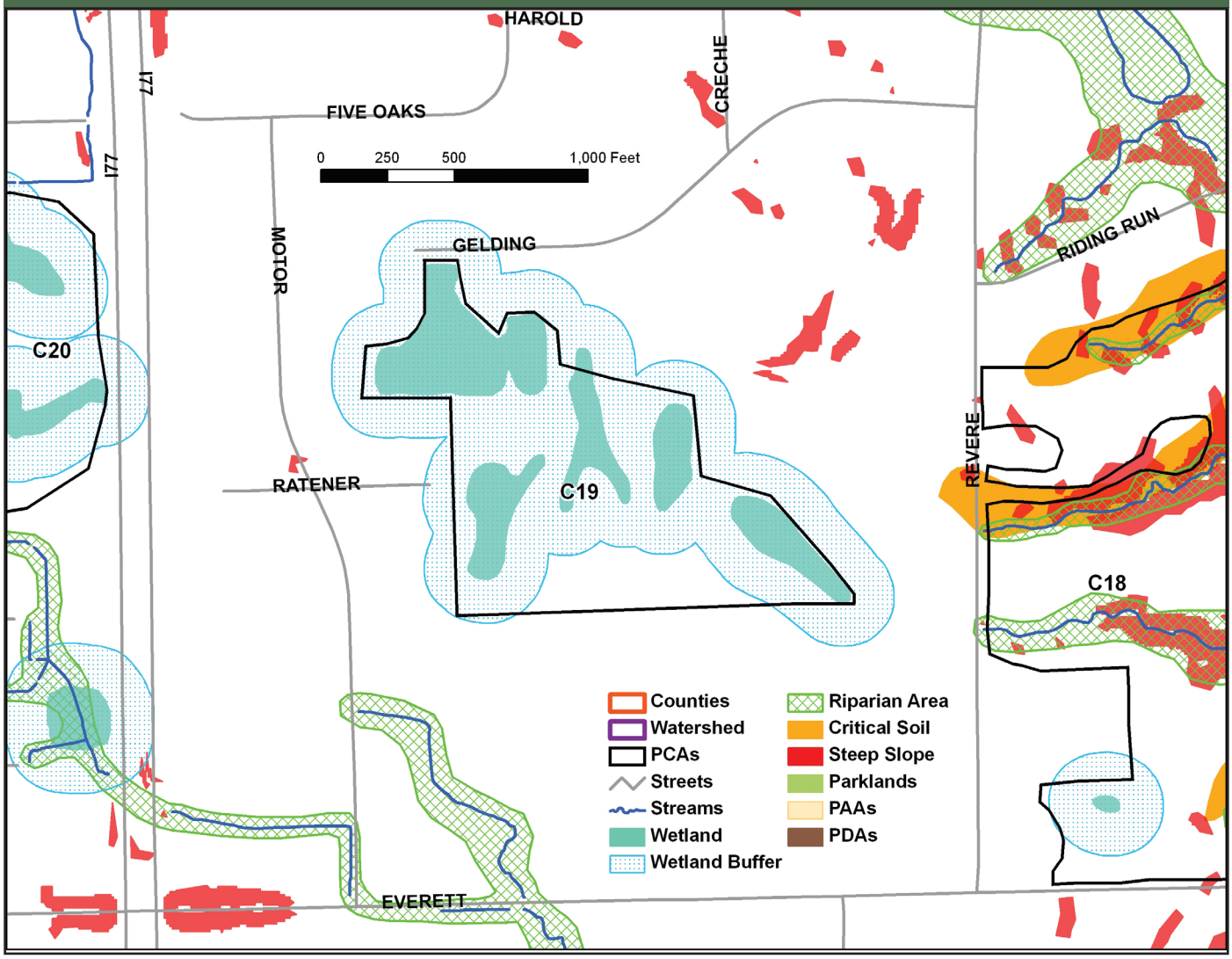
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C19



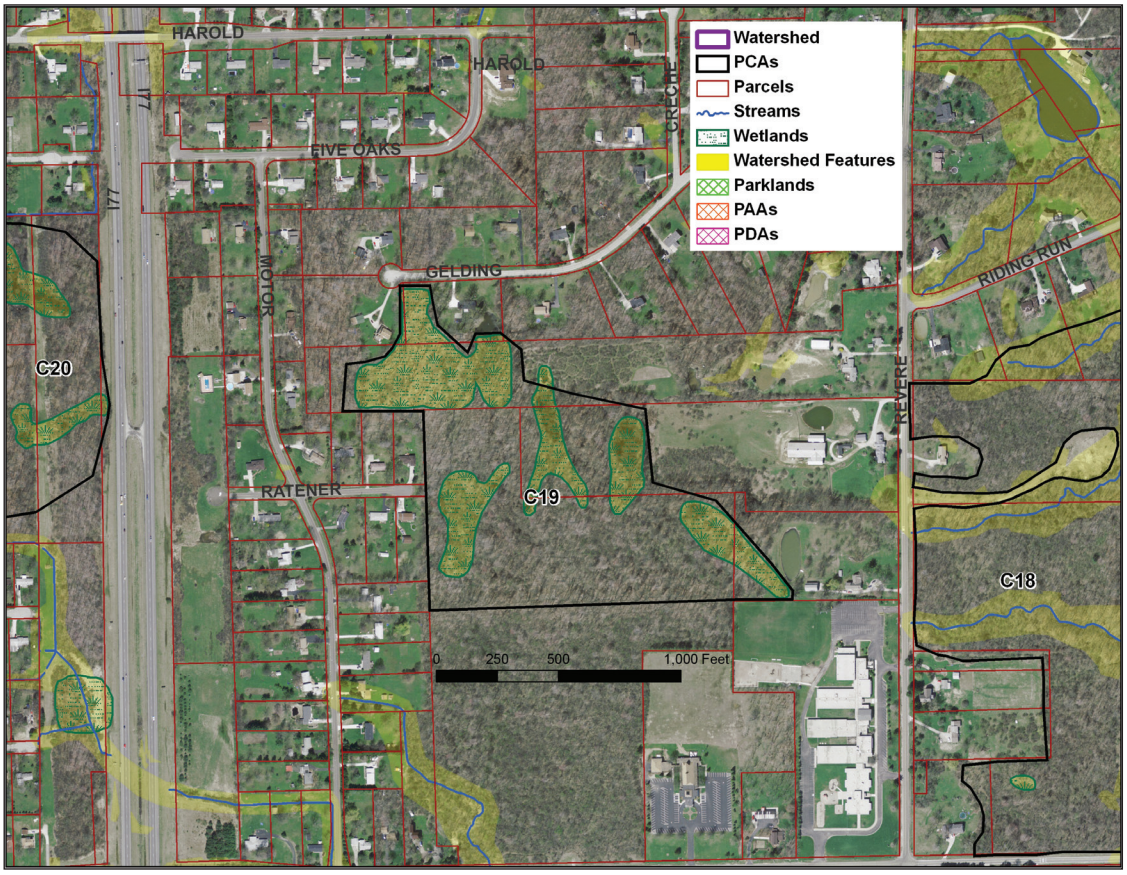
CRITICAL WATERSHED FEATURES

Priority Conservation Area C19

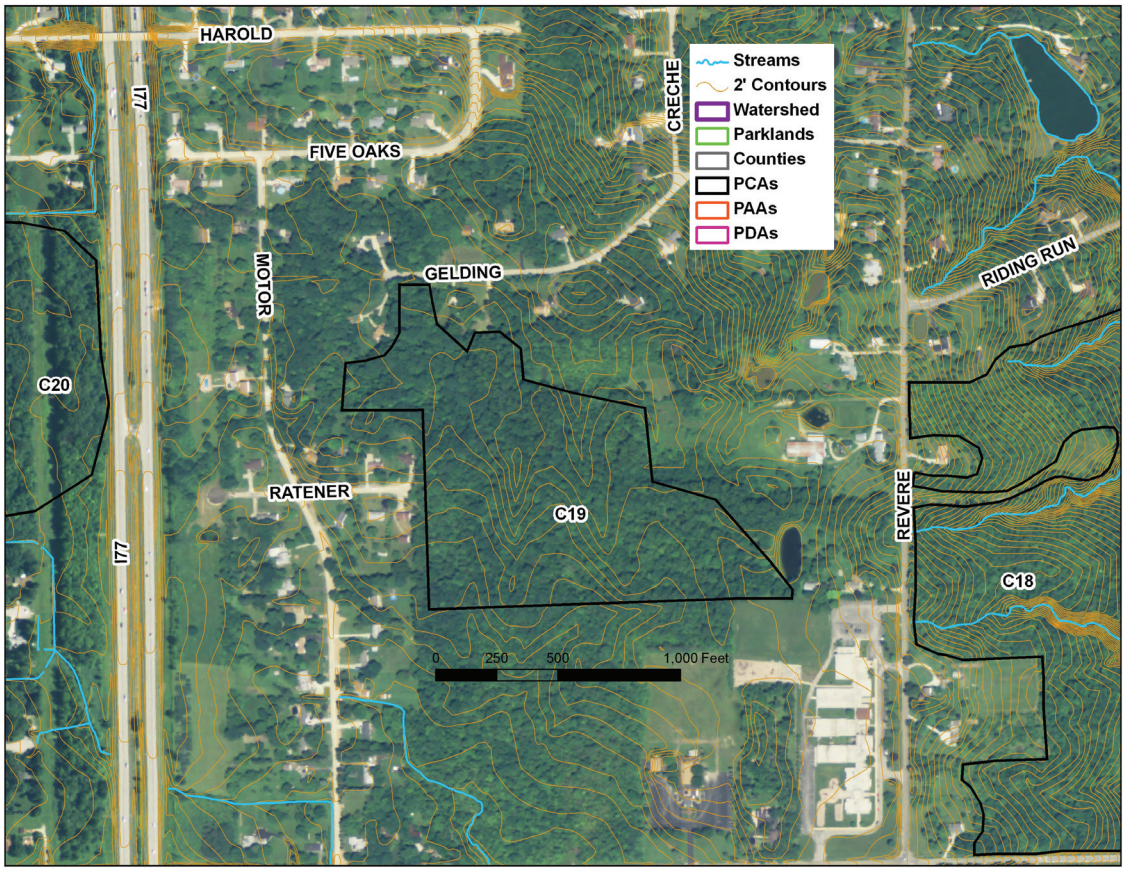
PCA C19 is located in Richfield Village in Summit County. This site is north of Everett Road between Motor and Revere Roads.

PCA C19 is in the southern portion of the watershed. Five forested wetlands have been identified on this site. Nearly the entire site is covered by wetland buffers. Additionally, there may be some un-mapped headwater streams.

Name	C19
Acres	27.3
Wetland Acres in PCA	9.3
Wetland Buffers Acres in PCA	14.4
Riparian Setback Acres in PCA	0.0
Riparian Area Acres in PCA	0.0
Forest Acres in PCA	26.6
Steep Slope Acres in PCA	0.0
Critical Soil Acres in PCA	0
Number of Parcels	5



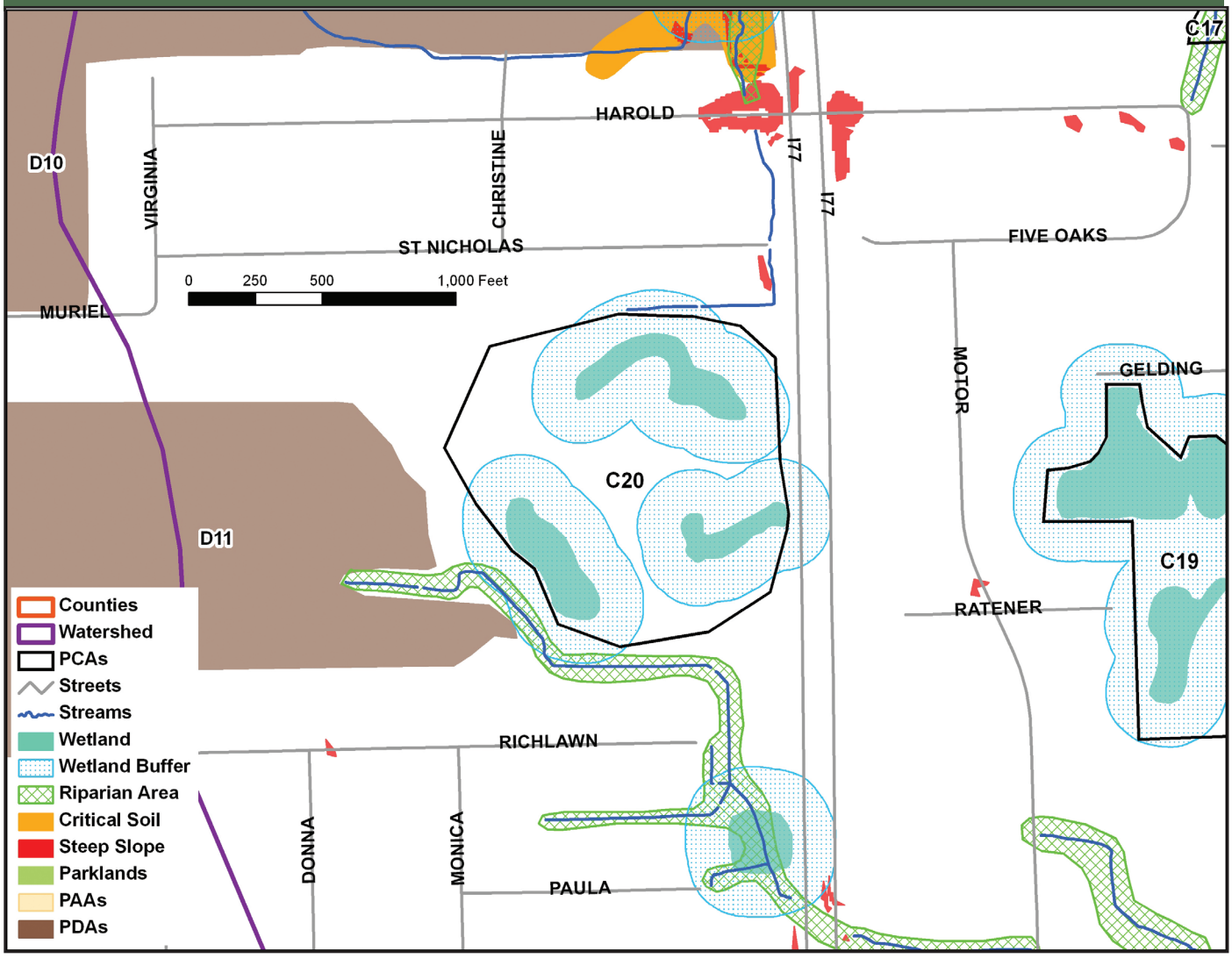
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C20



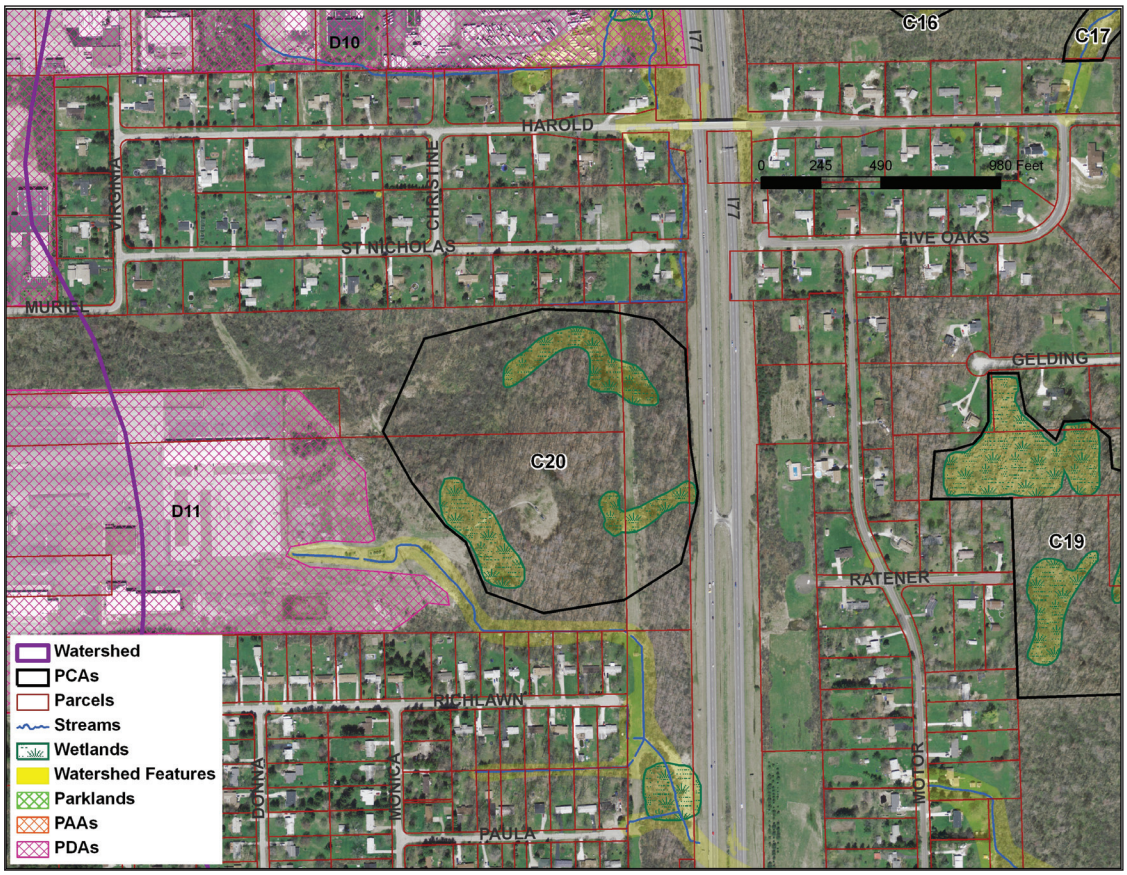
CRITICAL WATERSHED FEATURES

Priority Conservation Area C20

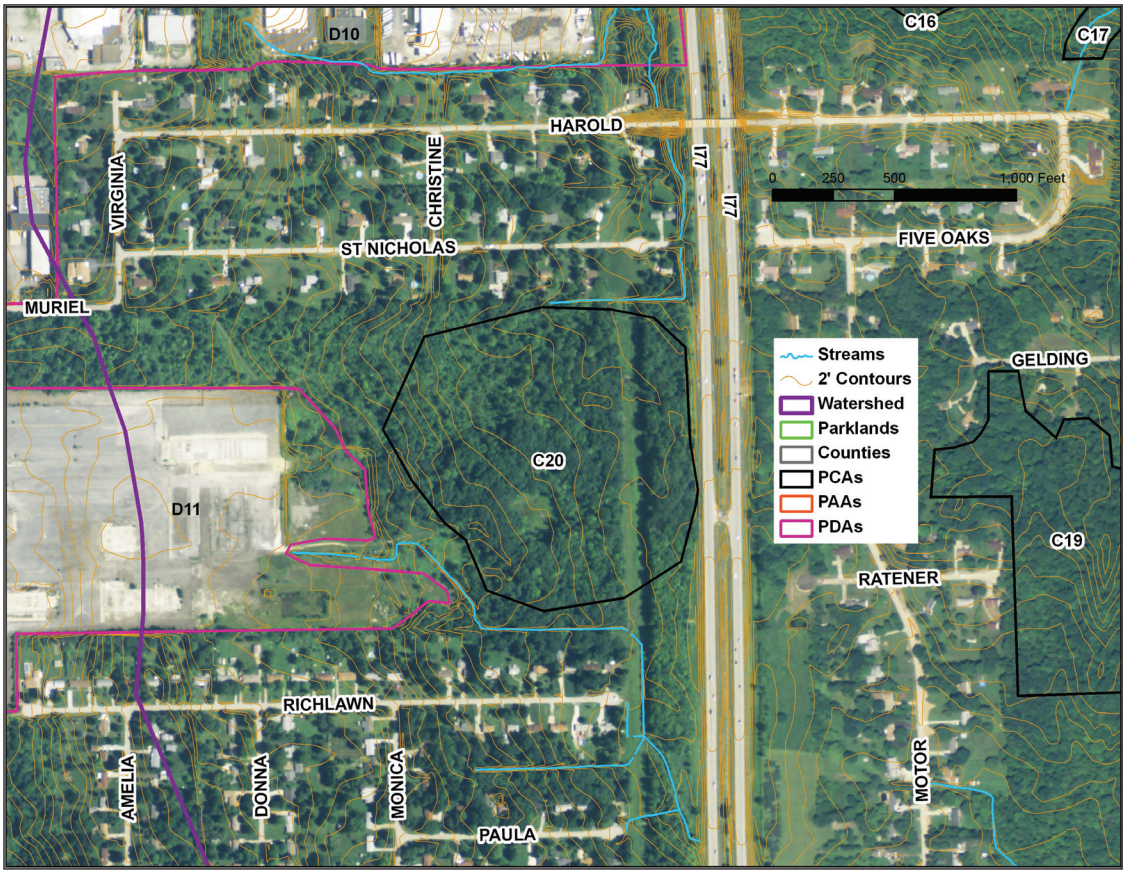
PCA C20 is located in Richfield Village in Summit County. This site is north of Everett Road between Brecksville Road and I-77. It is west of PDA D11.

PCA C20 is in the southern portion of the watershed. Three forested wetlands have been identified on this site. Most of the site is covered by wetland buffers.

Name	C20
Acres	28.1
Wetland Acres in PCA	4.3
Wetland Buffers Acres in PCA	16.2
Riparian Setback Acres in PCA	0.0
Riparian Area Acres in PCA	0.0
Forest Acres in PCA	25.5
Steep Slope Acres in PCA	0.0
Critical Soil Acres in PCA	0
Number of Parcels	3



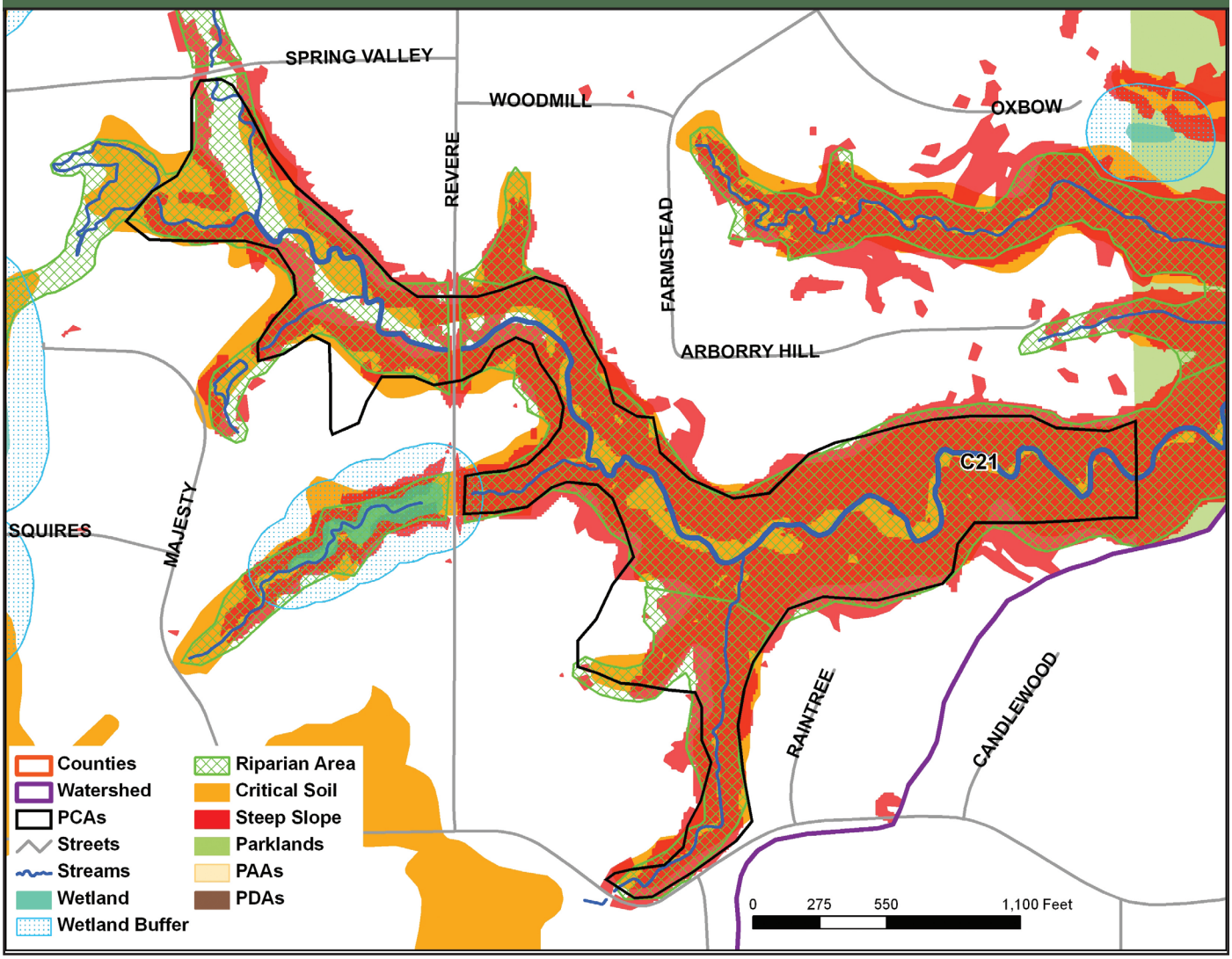
SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

Furnace Run

Priority Conservation Area #C21



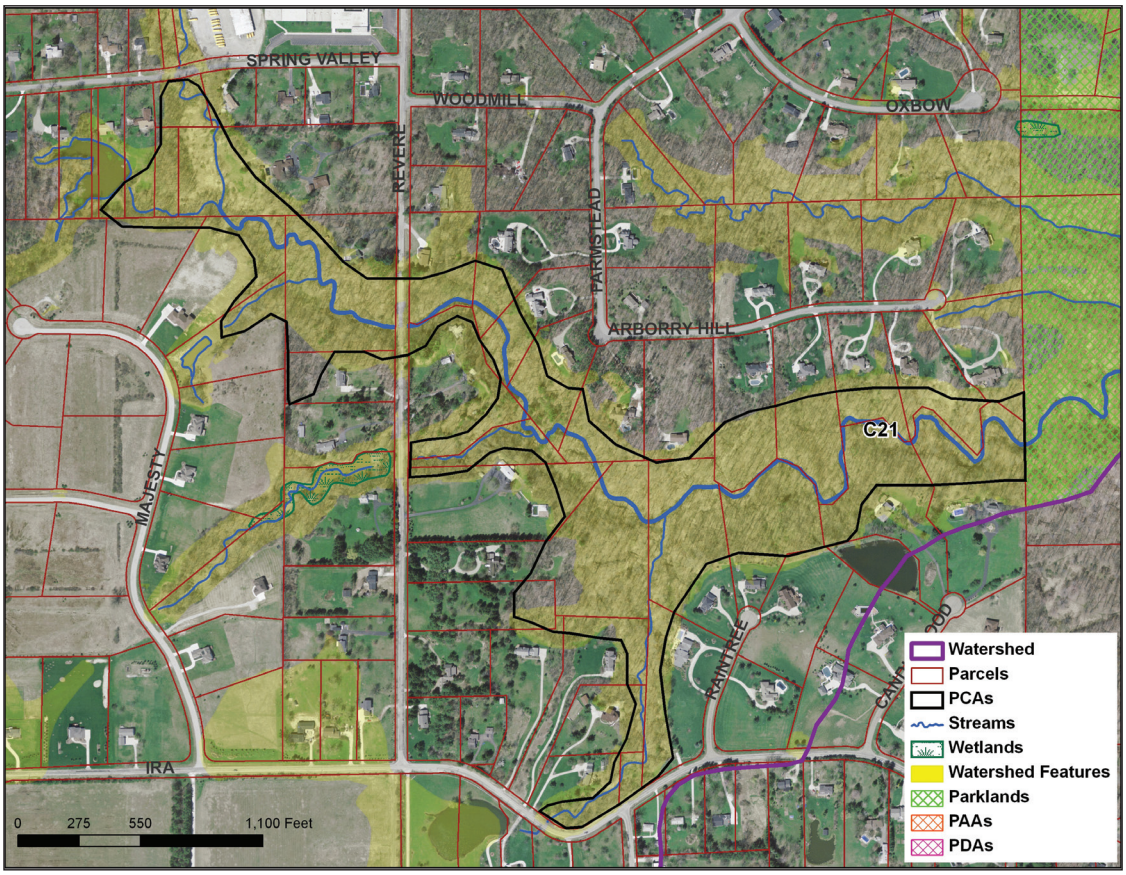
CRITICAL WATERSHED FEATURES

Priority Conservation Area C21

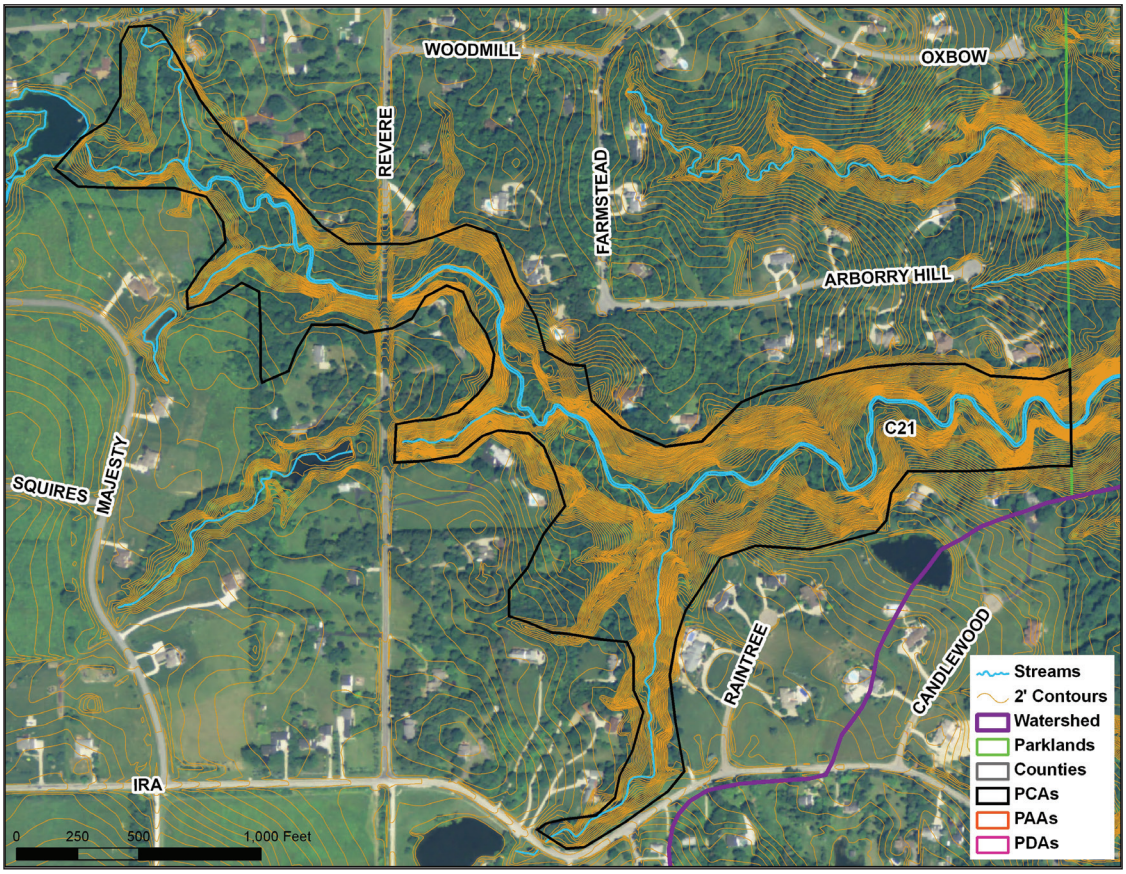
PCA C21 is located in Bath Township in Summit County. This site is north of Ira Road and straddles both sides of Revere Road.

PCA C21 is in the most southern portion of the watershed. It has a large, deep, steep-sided ravine with headwater streams and forested riparian areas. It has a riverine wetland. This site is adjacent to the west edge of Cuyahoga Valley National Park.

Name	C21
Acres	58.4
Wetland Acres in PCA	0.0
Wetland Buffers Acres in PCA	0.3
Riparian Setback Acres in PCA	24.2
Riparian Area Acres in PCA	53.5
Forest Acres in PCA	53.4
Steep Slope Acres in PCA	40.9
Critical Soil Acres in PCA	44.2
Number of Parcels	31



SPRING 2006 - PARCELS & WETLANDS



SUMMER 2010 - FOREST & CONTOURS

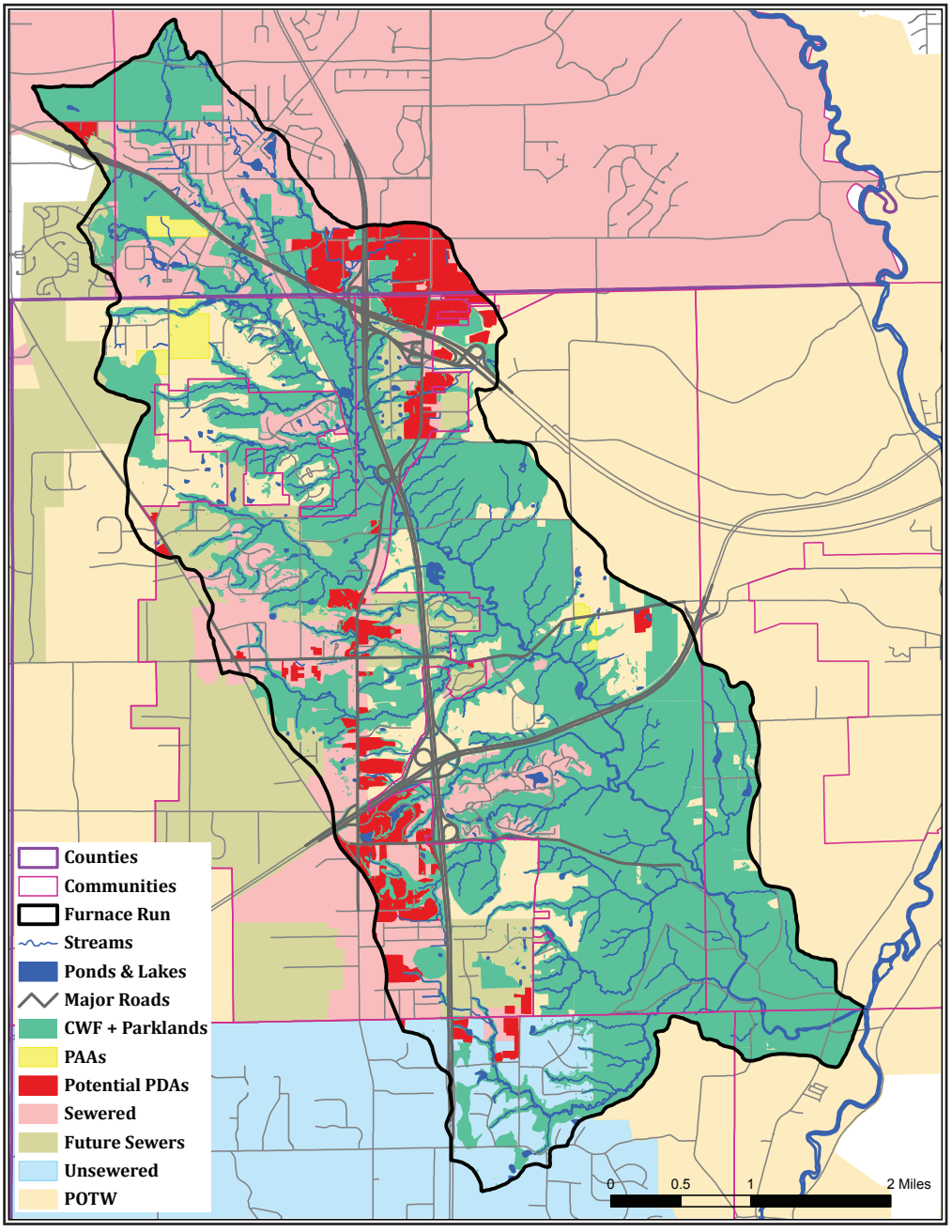
Furnace Run PDA

Priority Development and Redevelopment Areas

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

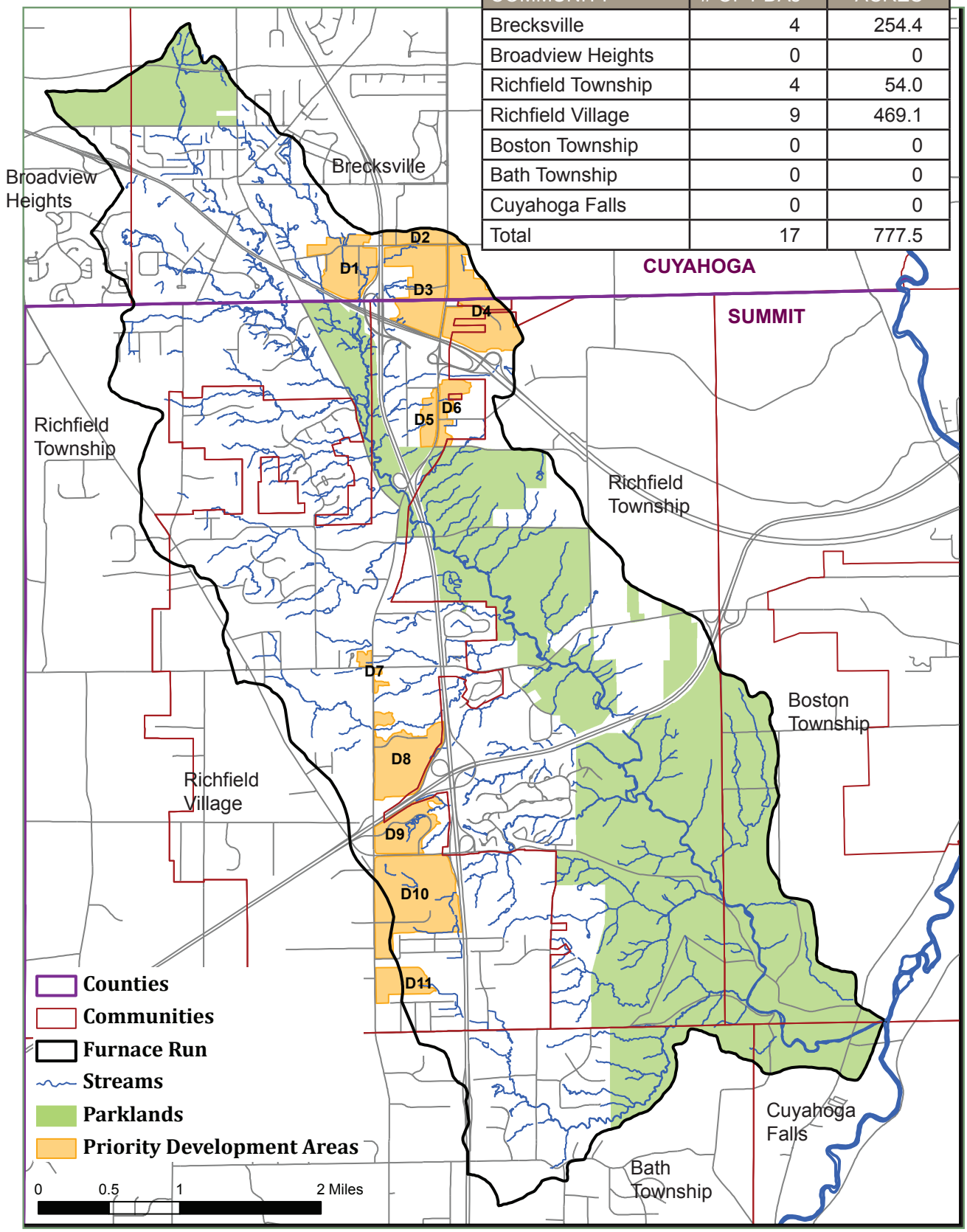
Criteria for determining Priority Development Areas in the Furnace Run watershed seek to promote the siting of new employment-producing development in existing urbanized areas as infill or redevelopment of underused sites.

COMMUNITY PRIORITIES for DEVELOPMENT in the FURNACE RUN WATERSHED	
	Listed in order of preference
1	Land areas with adequate existing utility services: electric/gas/water/sewer
2	Existing development areas that can be redeveloped
3	Land areas already characterized by urbanization
4	Larger tracts (e.g. greater than four acres) capable of optimizing low-impact development features
5	Land areas that are in close proximity to planned or existing related urban services such as retail or restaurants
6	Location on adequate primary roads
7	Areas which are located further than 100 yards from Critical Watershed Features



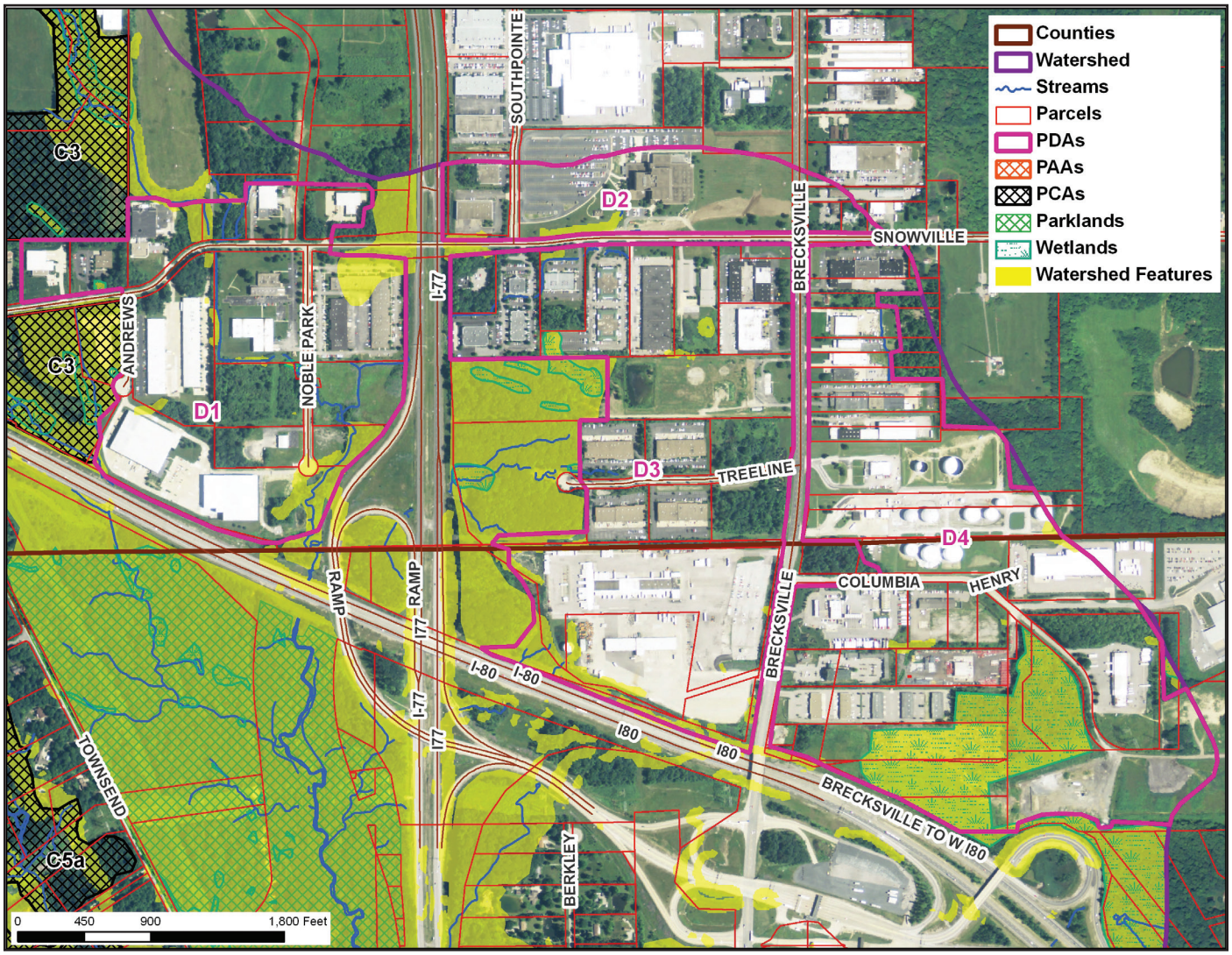
Priority Development Areas

COMMUNITY	# OF PDAs	ACRES
Brecksville	4	254.4
Broadview Heights	0	0
Richfield Township	4	54.0
Richfield Village	9	469.1
Boston Township	0	0
Bath Township	0	0
Cuyahoga Falls	0	0
Total	17	777.5



Furnace Run

Priority Development Areas #D1. D2, D3, D4



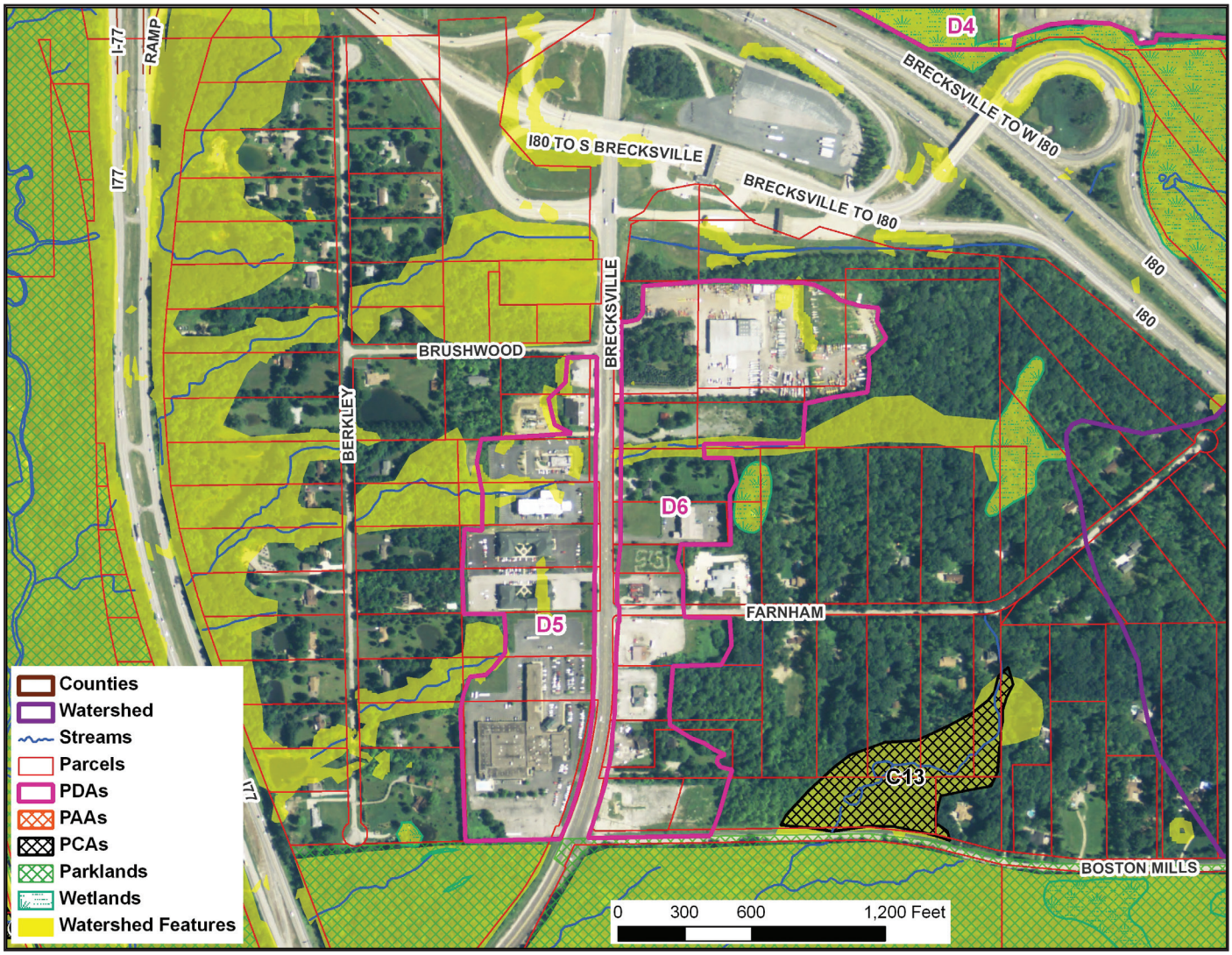
Priority Development Areas D1, D2, D3 & D4

PDAs D1 & D2 are located in the City of Brecksville in Cuyahoga County, north and east of the I-80 & I-271 interchanges. PDAs D3 & D4 straddle the boundary between Cuyahoga and Summit Counties. Both PDAs are in the City of Brecksville and the Village of Richfield, while PDA D4 is also in Richfield Township. D3 & D4 are north of the I-80 interchange at Brecksville Road.

All four PDAs have good access to major roads and interstate highways. These sites are already urbanized and have available necessary amenities for further commercial-industrial redevelopment.

These four urbanized sites are in the northeast portion of the watershed. Care should be taken to minimize any negative impacts to remaining wetlands and surrounding forests.

Name	Acres	Parcels
D1	95.6	19
D2	32.7	9
D3	123.5	22
D4	148.2	48



Priority Development Areas D5 & D6

PDAs D5 & D6 are located in the Village of Richfield in Summit County. These two sites are on Brecksville Road south of the I-80 Interchange.

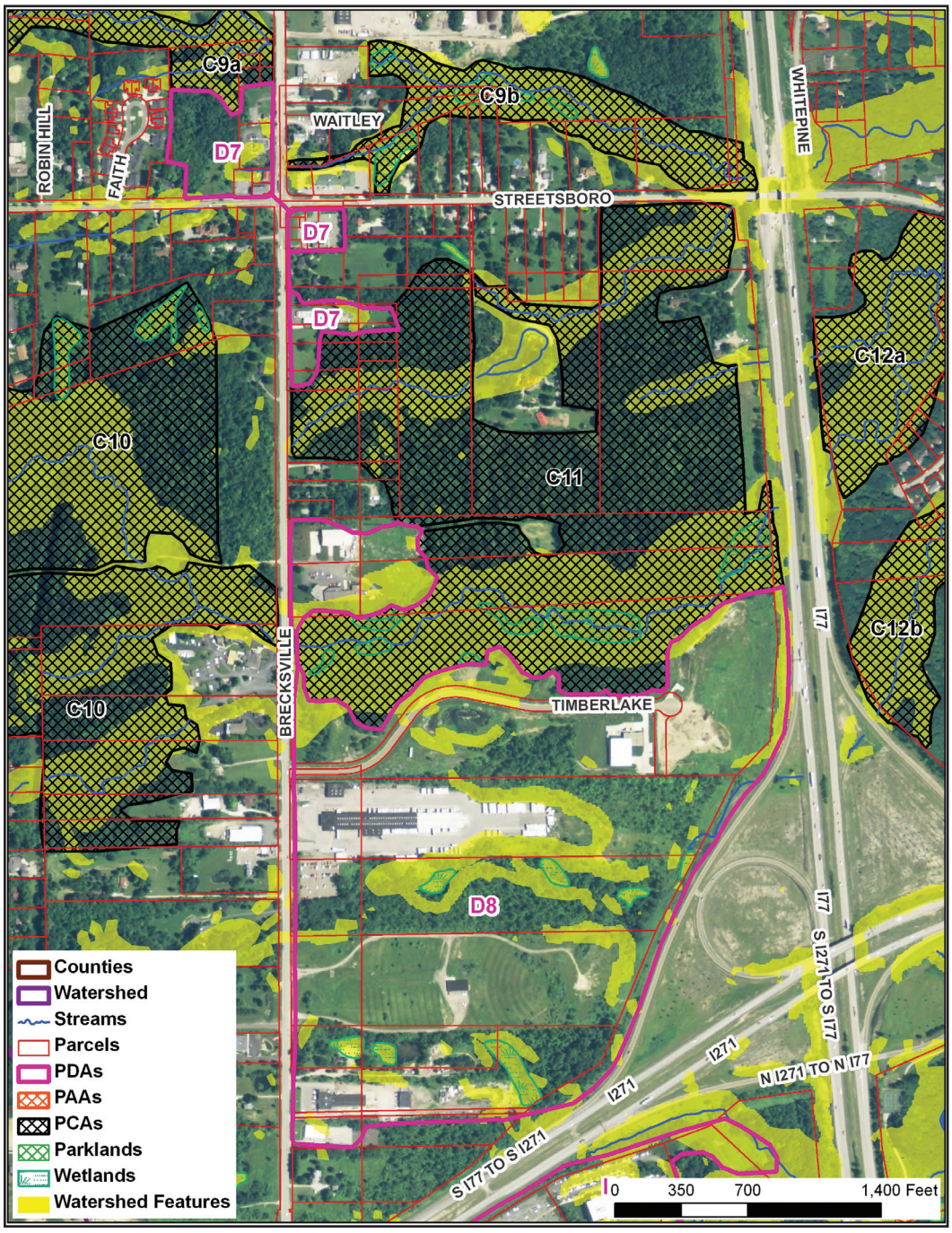
PDAs D5 & D6 are on either side of a major road, are already urbanized and have available necessary amenities for further commercial-industrial development/re-development.

These two urbanized areas are adjacent to the Cuyahoga Valley National Park and east of the Furnace Run Metropark, which can easily be reached off Brecksville Road.

Name	Acres	Parcels
D5	23.2	16
D6	33.5	21

Furnace Run

Priority Development Areas #D7, D8

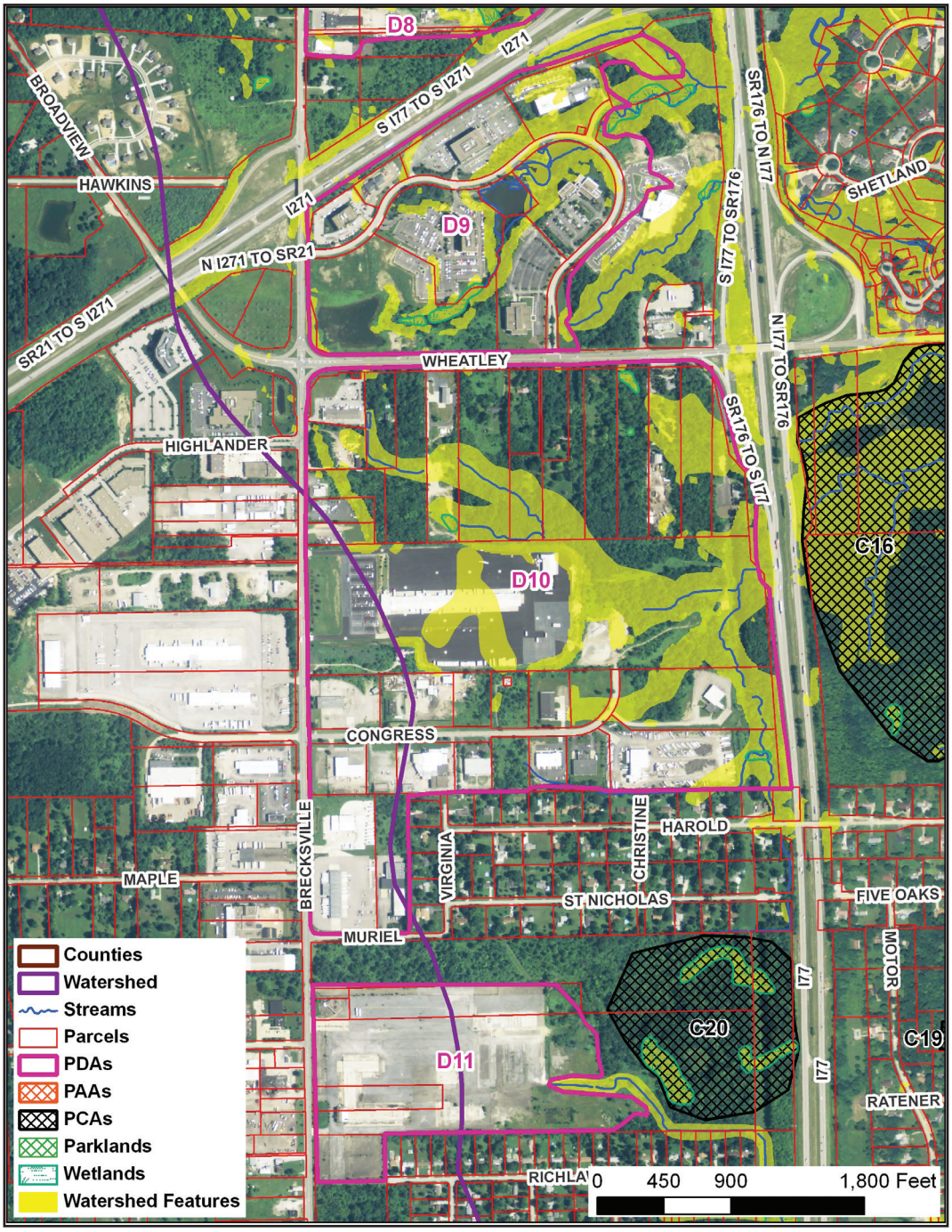


Priority Development Areas D7 & D8

PDA D7 & D8 are in the Village of Richfield in Summit County.

PDA D7 occupies both the northwest and southeast corners of the intersection of Streetsboro & Brecksville Roads as well as an area further south of the intersection along Brecksville Road. PDA D8 is located on Brecksville Road north and east of the I-271 & I-77 interchange.

Name	Acres	Parcels
D7	10.7	28
D8	122.0	21



Priority Development Areas D9, D10 & D11

PDAs D9, D10 & D11 are located in the Village of Richfield in Summit County. All three sites are on Brecksville Road south of I-271 and west of I-77. D9 is an industrial park which also has access off Wheatley Road. D10 has a variety of businesses with areas available for both redevelopment and new development. D11 is a former truck transfer site.

Name	Acres	Parcels
D9	76.9	11
D10	216.1	34
D11	46.7	10

PAA

Priority Agricultural Areas

Priority Agricultural Areas are those lands especially suited to raising crops or livestock or growing nursery plants, by virtue of having prime soils or other natural features that support agricultural use.

Criteria for determining Priority Agricultural Areas were based on the historic and current use of certain sites for agricultural purposes, which have been highly regarded in the community.

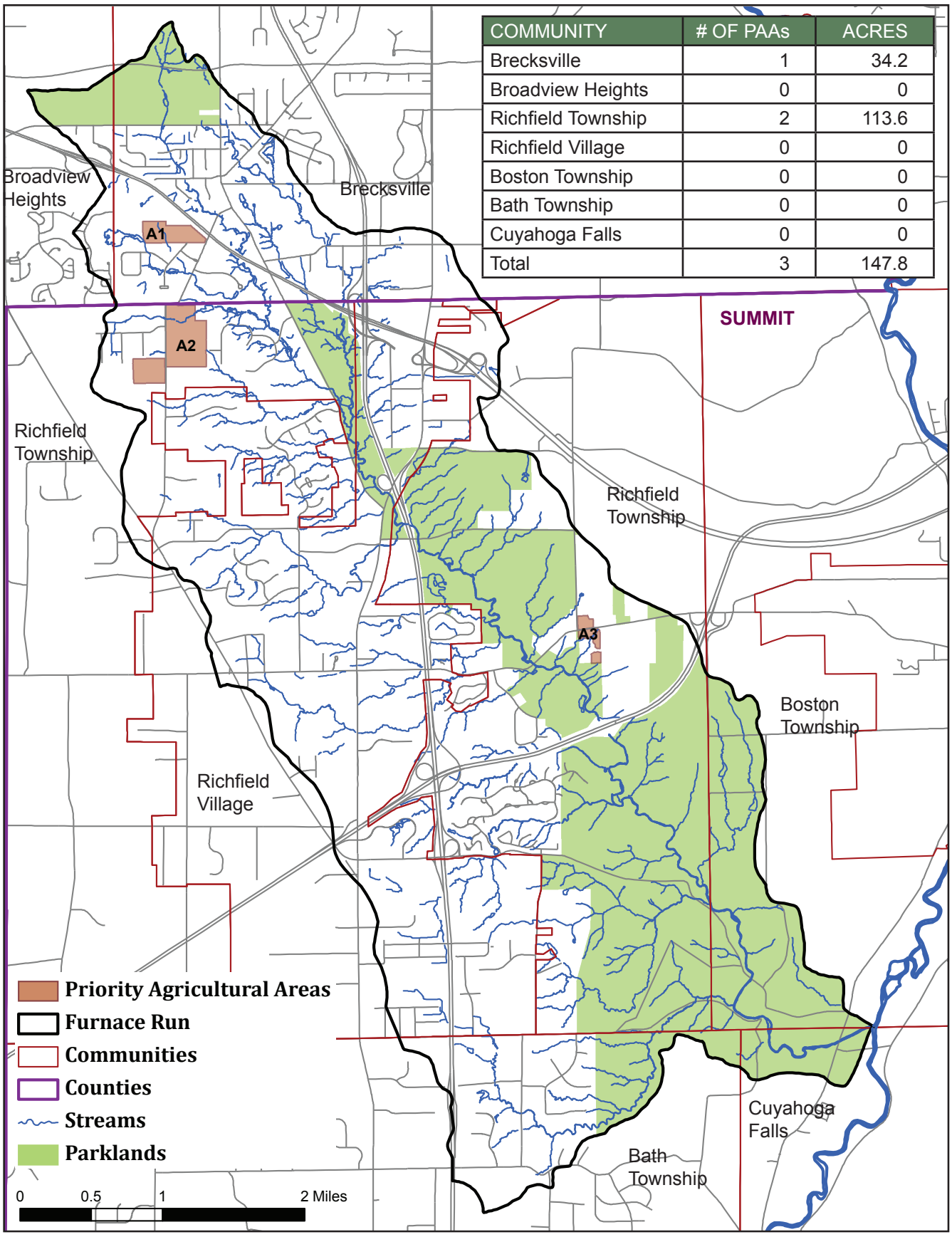
A continuing presence of land engaged in agricultural uses allows the Furnace Run communities to capitalize on new local food initiatives as the lands offer potential economic development features. While retaining the rural attractions these communities hold dear, the green infrastructure services they provide also offer benefits.

Three Priority Agricultural Areas were identified, comprising a total 24 parcels over 147.8 acres. The largest, the Luther Farm (PAA #2), contains 97.3 of those acres, on a corner of which sits a sizeable wetland. The farm holdings lie in the center of a most desirable area for residential development.

PAA #1 sits as a buffer between forest on its north edge and large-lot exurban residential development on its south edge.

The third PAA, #3, is a small but valuable site in an area touched by a Preferred Conservation Area and very close to surrounding parklands.

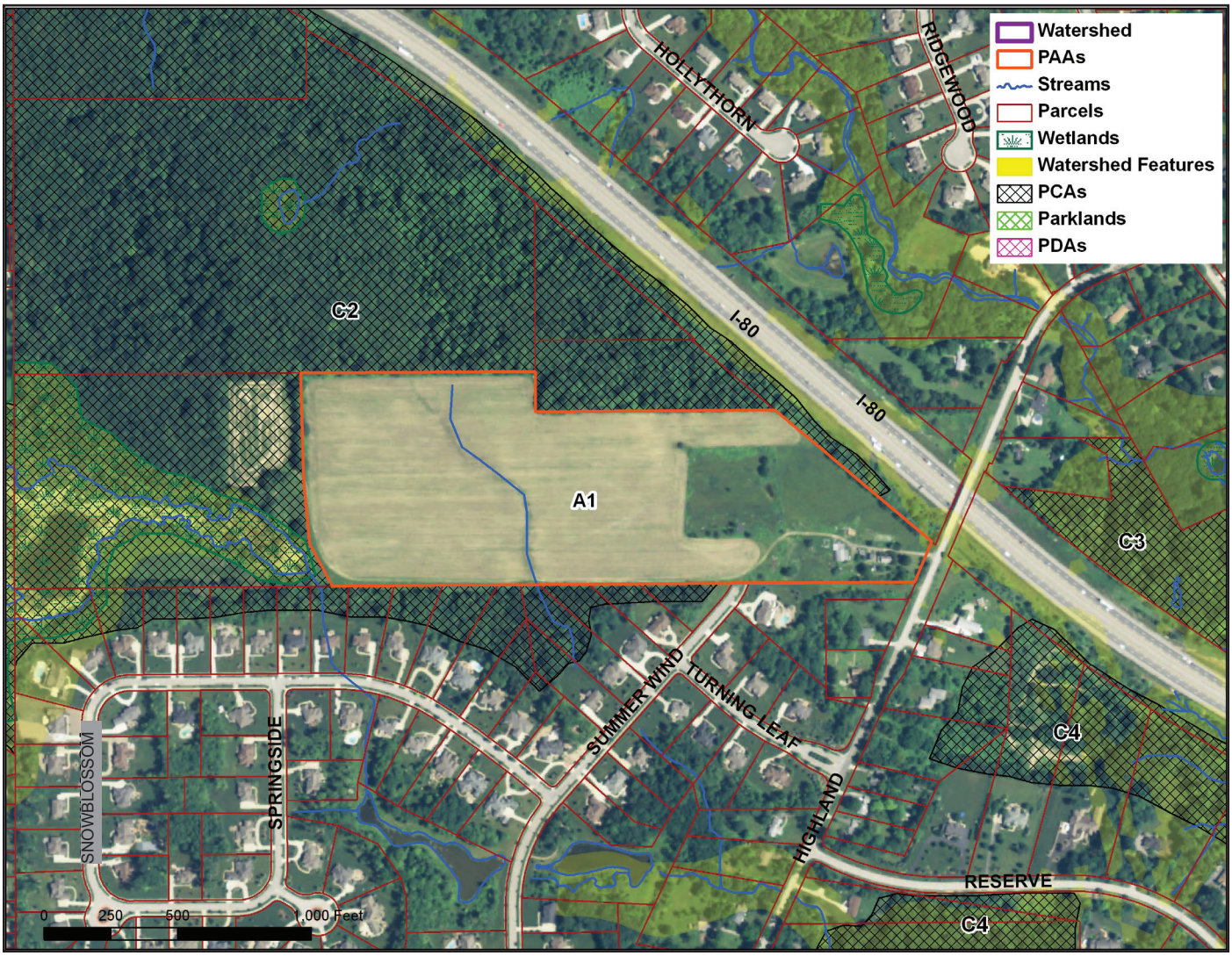
CHARACTERISTICS of PRIORITY AGRICULTURAL AREAS in the FURNACE RUN WATERSHED	
	Land that has been used historically for agriculture, whether currently in that use or available to return to such use
	Operating farms and agricultural operations with access to commercial routes
	Areas where growing operations with value to the move-ment toward locally-sourced food may expand
	Potential for on-site marketing and/or processing of goods
	Relationship to existing or potential conservation easements



COMMUNITY	# OF PAAs	ACRES
Brecksville	1	34.2
Broadview Heights	0	0
Richfield Township	2	113.6
Richfield Village	0	0
Boston Township	0	0
Bath Township	0	0
Cuyahoga Falls	0	0
Total	3	147.8

Furnace Run

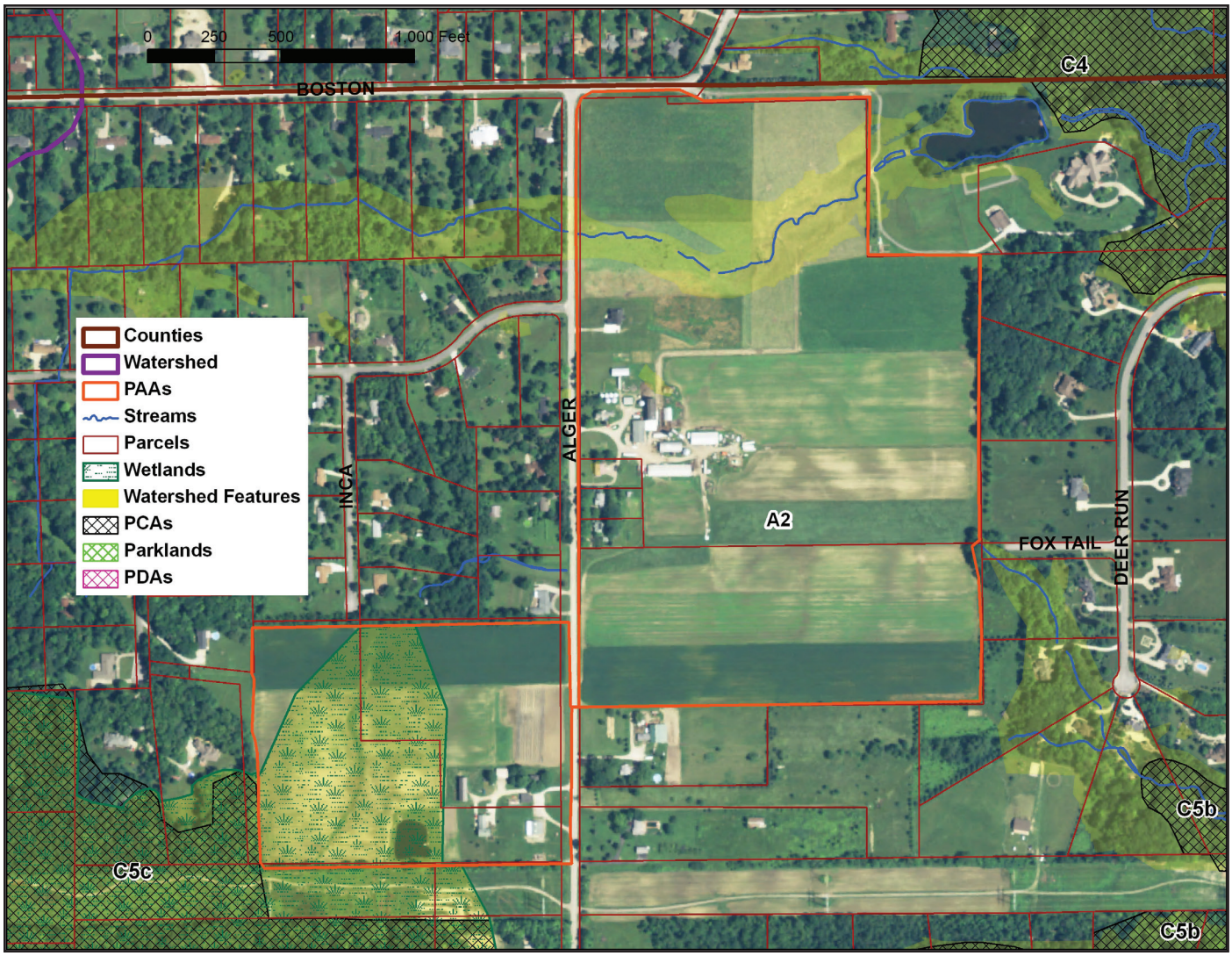
Priority Agricultural Area #A1



Priority Agricultural Area #A1

PAA A1 is in the City of Brecksville in Cuyahoga County. It is located south of I-80 and west of Highland Road. PAA A1 is surrounded by the forested PCA C1 and residential development.

Name	Acres	Parcels
A1	34.2	2



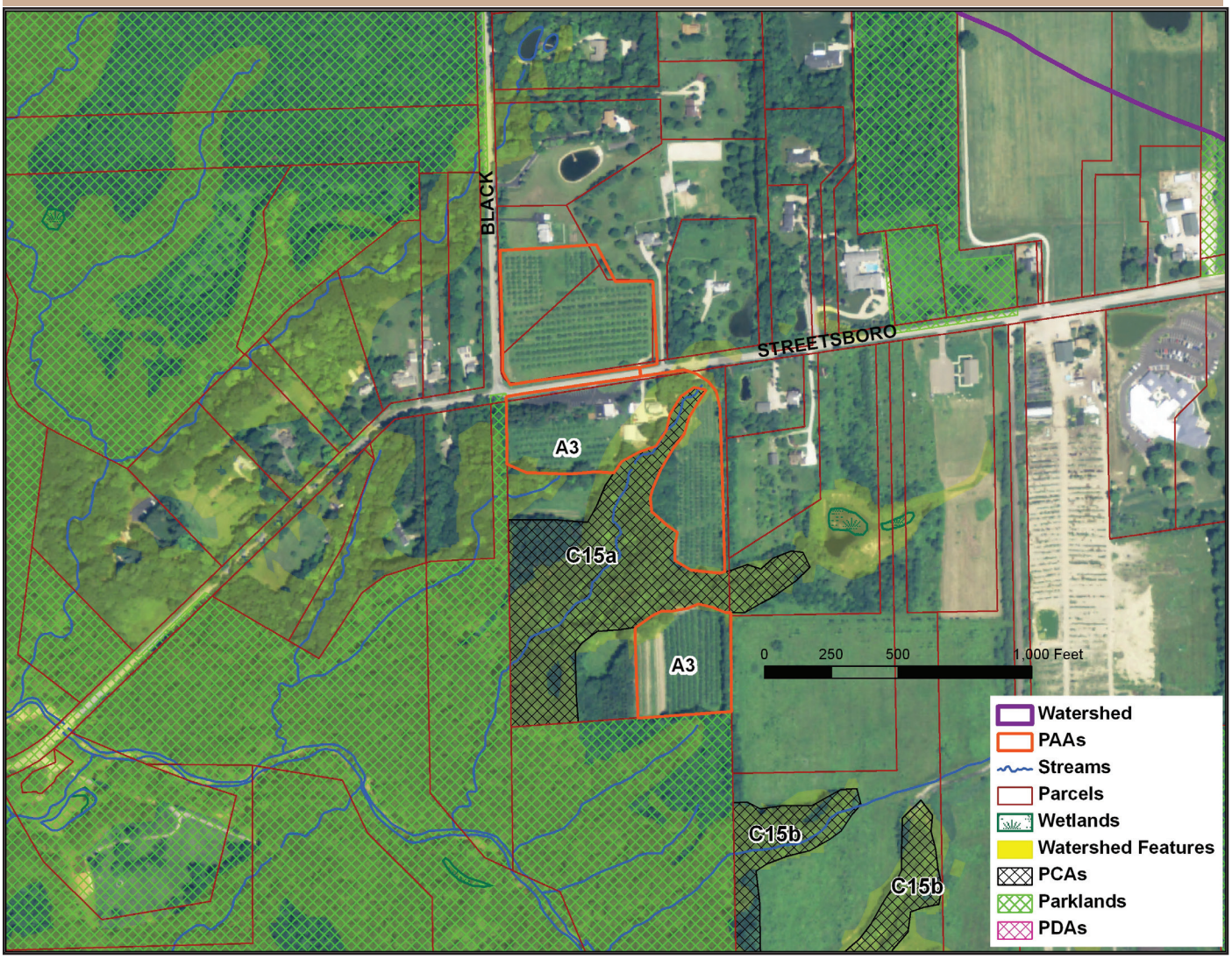
Priority Agricultural Area #2

PAA A2 is in Richfield Township in Summit County. It is located both east and west of Alger Road and south of Boston Road. PAA A2 is surrounded by residential development and is adjacent to PCA C5c.

Name	Acres	Parcels
A2	97.3	14

Furnace Run

Priority Agricultural Area #A3



Priority Agricultural Area #3

PAA A3 is in Richfield Township in Summit County It is located both north and south of Streetsboro Road and east of Black Road. PAA A3 is adjacent to the Cuyahoga Valley National Park and PCA C15a.

Name	Acres	Parcels
A3	16.3	8

Implementation

Preferred implementation tools

The Watershed Partnership members reviewed tools typically available for promoting watershed stewardship and implementing a watershed management plan.

- Some tools are regulatory and restrict potentially damaging actions
- Others are proactive to promote or reward good stream stewardship
- Some tools are designed to help to inform the citizens about the watershed and their responsibilities to promote a watershed friendly community culture
- Some tools directly target restoration actions of important stream features

These priorities were initially defined in March 2010 and revisited and refined by the WPP in 2011 as final plan implementation goals were set. The refined implementation priorities selected by the Partnership emphasize official recognition of critical watershed features in an official map and cooperative protection of these features through setbacks, restoration strategies and incentives:

1. Develop and adopt map that defines key features for non-structural distributed storm water storage and watershed management areas- PCAs / PDAs / PAAs
2. Adopt and enforce a consistent suite of setback regulations to protect critical stream features
   - Steep slopes
   - Riparian corridors
   - Wetlands
   - Flood zones - Protect flood zones & eliminate encroachments
   - Protect fragile & critical soils from erosion
3. Develop a forest protection and restoration management strategy and plan
4. Adopt and promote low impact design and on-site water retention practices
5. Restrict and promote new economic development to existing urbanized areas as infill or redevelopment of underused sites
6. Maintain the Watershed Partnership to sustain ongoing and planned collaborative stewardship efforts
7. Develop incentives to promote desired behaviors including:
   - Minimize paving requirements and promote infiltration and filter strips
   - Promote conservation easements

Furnace Run Balanced Growth Plan
Proposed Plan Implementation Actions & Timetable

ITEM	PREFERRED TOOL	ACTION	PROPOSED COMPLETION
1	Develop and adopt map of defined critical watershed features that identifies non-structural distributed stormwater storage and watershed management areas – PCAs / PDAs / PAAs	1) WPP recommends adoption to local governments 2) Local government adoption	November 2011 December 2011
2	Adopt and enforce a consistent suite of setback regulations to protect the critical stream features a. Steep slopes b. Riparian corridors c. Wetlands* d. Flood zones - protect & eliminate ncroachments e. Protect fragile & critical soils from erosion ** Review prioritized wetlands for possible mitigation and grant opportunities*	1) Joint ordinance review with subcommittee 2) Regular meetings of WPP, Planning Commission and BZA reps to promote watershed consistency in stream protection and enforcement 3) Seek RAP assistance	December 2011 Quarterly As needed
3	Develop forest protection and restoration management strategy and plan	WPP to participate in RAP Cuyahoga ReLEAF program	2011 - 2013
4	Adopt and promote low impact design and on-site water retention practices	1) Joint ordinance review 2) Regular meetings of WPP and local Planning Commissions and BZA reps	March 2012 Quarterly
5	Restrict greenfield development and promote new economic development in existing urbanized areas as infill, adaptive reuse or redevelopment of underused sites	1) Regular meetings of WPP, local Planning Commissions, BZA reps and Economic Development departments 2) Seek grants for economic development in PDAs with Ohio Lake Erie Commission assistance.	Quarterly As needed
6	Maintain Watershed Partnership to sustain ongoing and planned collaborative stewardship efforts	Recommend to local governments along with plan and map.	June 2011
7	Tax-based incentives, e.g. tax credits for land in PCAs/PAAs/PDAs	Participate in regional discussions	As scheduled
8	Defined measurable outcomes with ongoing monitoring and reporting and feedback loop	Annual Report to OLEC of actions taken - RAP assistance	June 2012

Notes

Item 2 – Wetlands, prioritized for importance to watershed plan goals, is included as an Appendix as part of the Plan report. These provide guidance to local communities for mitigation opportunities. Restoration Projects planned by Metroparks Serving Summit County and CVNP will be included in the suite of projects in order to facilitate eligibility for State incentives.

Item 3 – Forest priorities: RAP Cuyahoga ReLEAF project brochure is included in Appendices.

Tools for Watershed Stewardship

PRACTICES & STRATEGIES

Stormwater management begins with site planning and design. Development projects can be designed to reduce their impact 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 enforce setbacks
- Avoid floodplains
- Avoid steep slopes
- Minimize development on critical soils
- Use Low Impact Design (LID) measures
- Support conservation development practices
- Protect woodlands / tree canopy

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

Tools & Practices

#1

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 that 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 line 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 andPCAs.
  - ~ 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.

Adopt Critical Watershed Features Map

KEY ROLES	KEY ACTIONS
Legislators	• Update Community Master Plans, adopting Critical Features Map as overlay to guide land use decisions. • Incorporate Priority Conservation Areas (PCA) and Priority Development Areas (PDA) into community's Comprehensive Plan to guide zoning and identify natural areas as storm water management infrastructure assets • Develop or update building codes to include protections for critical areas • Use Map as reference to budget for protection, restoration and/or maintenance of natural infrastructure as is done for structural storm water infrastructure
Planning Commissions	• Develop and adopt Critical Features Map • Define specific allowable adjustments or variances, based on the value and location of critical features, to guide appeals process
Zoning Appeals Boards	• Use Map as reference for decision-making • Create guidelines, using Map to define allowable variances based on their potential impact on Priority Conservation Areas, and to direct site design adjus ments toward Priority Development Areas
Administration, Economic Development, Community Development	• Work with communities that share the watershed to approve the Critical Features Map, PCA and PDA designations • Adopt the Map and use it to guide development and conservation • Establish policy to direct new development to Priority Development Areas and reduce impacts on Priority Conservation Areas and Critical Watershed Features • Educate residents, business owners and developers on the significance of critical watershed features and their roles in stewardship
Service and Engineering	• Use the Map as a guide to take advantage of the natural storm water management infrastructure • Respect the Map designations and establish policies to manage infrastructure improvements or repairs in ways that do not negatively affect Priority Conservation Areas
Residents, Business Owners and Property Owners or Managers	• Support adoption of the Map in your community • Learn about the areas that hold your watershed's critical features and need conservation • Understand how activities that degrade or change the size, location or character of wetlands, forested areas, streams and soils affects your property
Developers	• Familiarize yourself with the Map and the watershed • Design sites so as not to infringe on Critical Features or Priority Conservation Areas

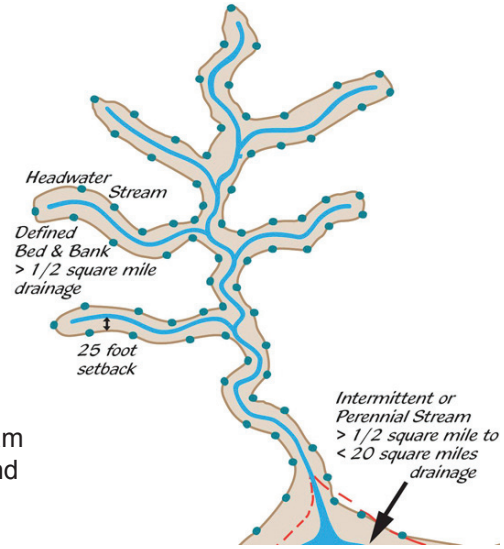
Tools & Practices

#2

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 stormwater 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 setback 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 these features.

Recommended Riparian Distances

DRAINAGE AREA	SETBACK DISTANCE
<0.5 sq. miles	25 ft
0.5-20 sq. miles	75 ft.
20-300 sq. miles	100 ft.
>300 sq. miles	300 ft.

KEY ROLES	KEY ACTIONS

Legislators, Planning Commissions	• Include riparian setbacks in zoning
	• Apply the setback to all designated watercourses in the community
	• Design setback codes to:
	  • Conform to minimum widths and 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
	• Extend setbacks at least to the 100-year floodplain

Zoning Appeals Boards	• Respect riparian setback codes and be reluctant to allow incursions into riparian buffer areas
Administration, Economic Development, Community Development	• Create incentives for preservation and improvement of existing vegetated buffers, and restoration of areas where riparian plantings have been lost
Service and Engineering	• 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. • 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.

Tree Commissions	• 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
	• Use riparian zones as forest mitigation banks to receive trees and forest cover
	• Create a forest mitigation fund to receive payments in lieu of planting from developers or property owners who remove trees or forest cover, and:
	  • use the funds to improve riparian areas on public lands,
	  • work with private property owners to restore riparian areas if buffer zones on public land are not available,
	• in cases where neither of the above solutions are applicable, use the funds to support the city’s urban forest/street tree planting program

Residents, Business Owners and Property Owners or Managers	• 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. • 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.
Developers	• Familiarize yourself with the Map and the watershed • Design sites so as not to infringe on critical features or conservation areas

Tools & Practices

#3
CONSERVE WETLANDS & SETBACKS

Wetlands are areas that are inundated or saturated by surface or ground water often enough 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 Furnace Run Watershed. Wetlands function as natural sponges, to absorb excess stormwater and as natural kidneys, to filter pollutants from the water. They minimize flooding problems by retaining stormwater and allowing the water either to evaporate or slowly release into stream systems.

In Furnace Run 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 wetland and a 30-foot setback extending beyond the outer boundary of a Category 2 wetland. As for Category 1 wetlands no setback has been suggested in the model ordinance. However, these wetlands have the potential for enhancement and can be improved to Category 2 wetlands.

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

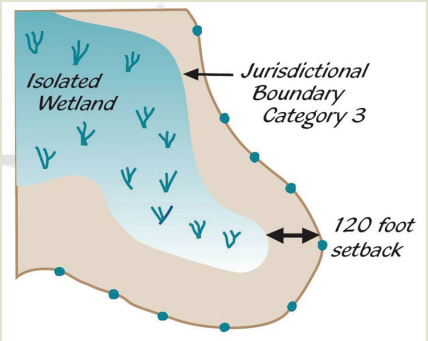
RECOMMENDATIONS:

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 ordinances 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 protect public health and safety and water quality and quantity, and deserve protection. Category 1, 2 and 3 wetlands are defined by Ohio EPA using a Qualitative Assessment Form.

Recommended Wetland Setbacks

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



Conserve Wetlands & Setbacks

WETLAND CATEGORIES

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.

KEY ROLES	KEY ACTIONS

Legislators,
Planning Commissions
	• Include wetland setbacks in zoning
	• 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)
	• Design setback codes to:
	  • Conform to minimum widths and recommended distances
	  • Include 100-year floodplains
	  • Include variance and mitigation provisions to keep function within the same watershed
	  • Provide for inspection and enforcement
	• Integrate in Conservation Development zoning

Zoning Appeals Boards	• Enforce wetland protection codes
Administration, Economic Development, Community Development	• Create incentives for preservation and improvement of existing wetlands, and restoration of Category 1 wetlands to provide in-watershed mitigation sites
Service, Engineering, Building Inspectors	• Observe Clean Water Act regulations and enforce US Army Corp of Engineers permits • Monitor construction sites closely for deviation from approved plans • Require construction vehicles to stay proper distances away from wetlands
Residents, Business Owners and Property Owners or Managers	• See wetlands as enhancements and scenic, educational or recreational resources • Maintain a dense buffer of native vegetation between any paved surfaces and the wetland • Do not plant invasive species where seeds can be blown or washed into wetlands
Developers	• Recognize the value of wetlands and preserve whenever possible • Mitigate lost wetlands on site when possible • Building “up” rather than “out” can help you use a site footprint limited by setback requirements • Respect permit requirements and keep construction vehicles far away
Stewardship Groups	• Use wetlands as educational resources • Create a guide to the birds and animals that live in or visit the wetland

Tools & Practices

#4
CONSERVE 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 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 extended outward to meet the flood zone boundary.

RECOMMENDATIONS:

Floodplain areas should be avoided on a development site in the Big 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.
- Adopt ODNR floodplain regulations.
- Focus development in areas where it will have the least impact - out of the floodway.

Conserve Floodplains

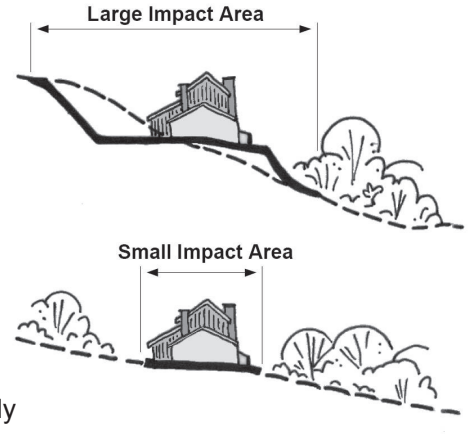
KEY ROLES	KEY ACTIONS
Legislators, Planning Commissions	• Incorporate the most up-to-date flood plain maps into zoning and building codes • Recognize that increased impervious surfaces in one area will have the effect of enlarging flood plains of downstream areas • Provide incentives or relief to landowners in areas where floodplains create un-buildable areas • Allow increased density on development sites in lowest-impact areas • Change codes to allow higher “weed” growth in flood plains
Zoning Appeals Boards	• Respect floodplain boundaries • Recognize that variances allowing structures to encroach on floodplains will inevitably create problems
Administration, Economic Development, Community Development	• Support floodplain preservation with policies that support generous setbacks and encourage landowners to vegetate and maintain riparian corridors and floodplains • Focus development in areas where it will have the least impact • Encourage developers to design sites with structures away from flood plains, and with pervious surfaces and dense, natural landscaping close to flood plain boundaries
Service and Engineering	• Use structural flood management systems only as complements to natural systems. • Reduce channelization and culverts upstream so that floodplains downstream can handle increased loads • Keep riparian areas and flood plains vegetated by reducing mowing
Residents, Business Owners and Property Owners or Managers	• Be aware that solutions to “rush and flush” water off your land will invariably create flooding problems downstream • 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 • Use permeable paving surfaces in areas near flood zones to increase the speed at which the water infiltrates into soils • Let vegetation grow higher along flood plains
Developers	• Design sites so as to leave plenty of room beside flood plains • Keep areas along flood plain boundaries heavily vegetated • Use permeable paving throughout the site, and include vegetated areas to hold excess water (rain gardens, etc.)

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 12% 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 pose 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.

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 12% to avoid erosion or slippage.

Three options can help 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 12% 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 12-17%
- Add 30 feet for slopes between 18-20%

Avoid Steep Slopes

RECOMMENDATIONS, continued

- 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. An example is North Royalton's riparian setback adjustment, which is 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, 12% or greater, exist within 500 feet of a watercourse. In these areas, a plan is required that details the degree of sloping, the slope length, soil erodibility, vegetative cover, and sediment delivery.

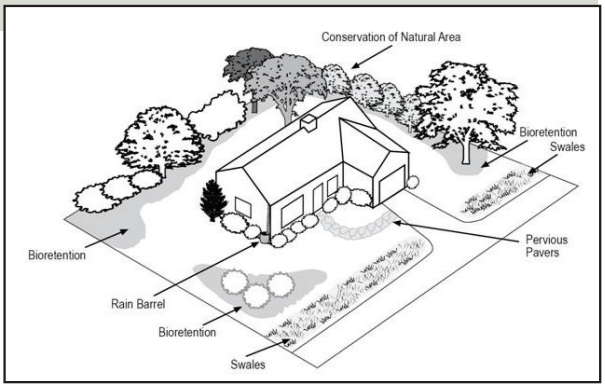
Option 3 (Preferred) provides the best alternative, as it based on site-specific conditions and recommendations.

KEY ROLES	KEY ACTIONS
Legislators, Planning Commissions	• Expand riparian setbacks based on site-specific conditions, especially where slopes are greater than 12% and are within 500 feet of a watercourse. • Conserve steep slopes, especially those close to riparian corridors, with special permitting that limits development and disturbances in areas with slopes greater than12%.
Zoning Appeals Boards	• Do not allow variances that encroach on setbacks from steep slopes • Do not allow replacement of vegetation around steep slopes with impervious surfaces, including turf grass.
Administration, Economic Development, Community Development	• Discourage development on or adjacent to steep slopes • Work with private landowners to establish conservation areas where steep slopes exist. • Invest in restoration where development may already be negatively impacting soils and degrading slopes.
Developers	• Design sites to avoid building near steep slopes. Structural solutions may be short term remedies, but soils erode. Period. • Avoid disturbing steep slopes during construction. Construction equipment will change soil character and compaction. • Replace any disturbed soils with native vegetation, preferably the type with large and/or dense root systems
Stewardship Groups	• Support preservation and enhancement of these areas, which are usually wooded • Educate landowners about the importance of conservation

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

#6 USE LOW IMPACT DESIGN (LID)



Low-impact design (LID) is a site design approach that 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 levels through innovative practices.

LID's goal is to mimic natural hydrology and processes by using small-scale, decentralized practices that infiltrate, evaporate, detain, and transpire stormwater, 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.

RECOMMENDATIONS:.

- Adopt Low Impact Design 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: Set maximum numbers of parking spaces rather than minimums, using average demand rather that peak demand, minimize the dimensions of lot spaces, use alternative pavers in overflow parking areas, use 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: LID principles are designed to minimize disturbance and manage storm water as close to its source as possible. Specific low impact design controls, called Integrated Management Practices (IMPs), 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

Example: City of Kent's Low Impact Development Ordinance - Chapter 1203

Use Low Impact Design(LID)

KEY ROLES	KEY ACTIONS
Legislators, Planning Commissions	• Allow for implementation of LID techniques in building codes • Adopt LID provisions in zoning of residential, commercial and industrial districts • Set maximum parking lot size rather than minimum. Size for average demand rather than peak demand • Limit area of impervious surface allowed, including roofs and impervious paving, as percentage of total area.
Zoning Appeals Boards	• Allow variances for LID techniques
Administration, Economic Development, Community Development	• Encourage residents and businesses to retrofit properties with LID elements, and support code changes if necessary • Incentivize installation of LID practices on existing properties; recognize the stormwater management value and contribution to reduction of cost and burden on municipal systems • Reward developers who use LID practices and reduce your stormwater infrastructure costs
Service and Engineering	• Adopt LID for community-owned properties and offer as demonstration sites
Stewardship Groups	• Train residents and landscapers to build raingardens, and sponsor demonstrations • Encourage installation of rainbarrels, ponds and other backyard-friendly water storage and management practices
Residents, Business Owners and Property Owners or Managers	• 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. • Install pervious pavers in place of concrete or asphalt. • Replace turf grass with more pervious ground cover. • Plant trees.

Developers	• Use Integrated 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:
	  • Riparian and wetland setbacks
	  • Biofiltration facilities to hold and filter discharge
	  • Vegetated swales to absorb and drain water
	  • Green roofs to reduce runoff
	  • Cisterns & rainbarrels for water harvesting and temporary storage
	  • Infiltration trenches
	• Use pervious/permeable paving materials for significant portions, if not all, of paved walkways and parking surfaces
	• Replant trees and forest cover lost during construction

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

#7 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 open spacesinto neighborhoods
- Uses open space to protect natural resources
- 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

RECOMMENDATIONS:

- Make Conservation Development the easiest development option available: This can be done be making conservation development permitted by right (the best option) or as an overlay district (second best option). Add these provisions to residential, commercial and industrial codes.
- Permanent protection of open space: At least 40% open space should be permanently protected through conservation easements, deed restriction or a combination. Provisions should be made for, including provisions for access for maintenance and capital improvements.
- Open space should be high quality and used for resource protection: Provisions must be made to minimize fragmentation of open space and link to other open spaces in the community. Requirement should be made for developer to prove that the highest quality resources on the site were evaluated and are protected via the open space.
- A minimum project size should be designated: In order for projects to have a beneficial impact upon natural resource conservation, a minimum project size of 25 acres should be considered.
- Density Bonuses (no more than 10%): when specific conservation criteria are met, proposed developments can be approved with more use of a site (such as more dwelling units per acre) than would otherwise be permitted by the community. Density bonuses are a form of incentive that a community can offer to a developer who does the kind of development that a community seeks.

Conservation Development

Residential Conservation Development

- At least a 40% open space requirement must be included for lot sizes less than one acre, with 50% for lot sizes greater than one acre
- Density bonuses should not exceed 10% in order to ensure a conservation benefit result
- Maximum access to the open space by private users should be required

Office Park Conservation Development

- At least 40% open space requirement, of which 25% is natural open space

Commercial Conservation Development

- For areas already zoned commercial, open space requirement is 25%
- Open space requirement should be at least half of the natural functioning open space

Examples:

- Richfield Township, OH Planned Residential District - Chapter 404
- Hudson, OH Rural Residential Conservation - Chapter 1205

KEY ROLES	KEY ACTIONS
Legislators, Planning Commissions	• Make Conservation Development the default site design option • Require minimum 40% naturalized open space • Reduce open space credit for heavily-fertilized, barely pervious turf grass cover, and increase for forest area or use as mitigation bank.
Zoning Appeals Boards	• Do not allow variances post-construction or post-occupancy that would reduce conservation area percentage. • Require that variances you must approve be mitigated on site in comparable size or watershed function.
Administration, Economic Development, Community Development	• Offer incentives for Conservation Development • Use density bonus as incentives to cluster impervious surfaces
Developers	• Choose site design options that maximize preservation and function of natural areas. • Avoid filling open space with barely-pervious turf grass • Use Low Impact Design practices on parcel design

Conservation Development should not be confused with Low Impact Design (LID):

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

Tools & Practices

#8 WOODLAND/TREE CANOPY PROTECTION

A Tree Canopy program helps communities preserve or restore existing canopy to maintain a certain percent coverage. The percent coverage often depends on the underlying zoning.

Key Benefits
- Stabilizes soils
- Cleanses stormwater, helping to improve water quality
- Reduces flooding problems by managing stormwater
- Conserves household energy costs
- Provides 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. It also protects drinking water supplies, enhances property values and reduces 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 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.)

In order to establish canopy cover goals, 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 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

Examples of forest management programs

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

Olmsted 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

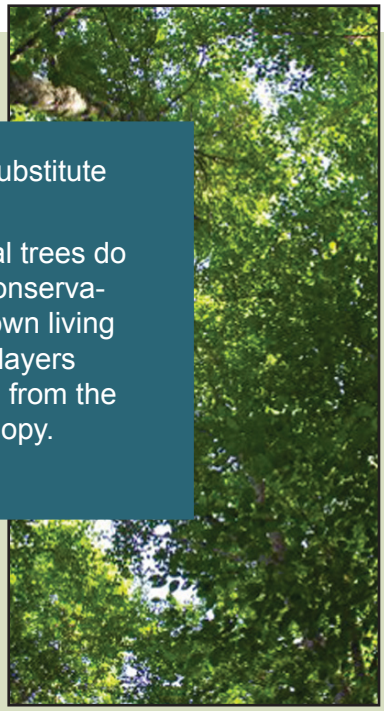
C. Wooded areas within buildable property

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-inches and maximum size of 6 caliper-inches.

Springfield Township's Tree Preservation Ordinance (Chapter 550.5) states existing woodlands shall be maintained and preserved. On residential and nonresidential development:
- A minimum 50% of mature woodlands shall be preserved
- A minimum 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

A street tree program is not a substitute for a forest canopy plan.

Ordinances protecting individual trees do not address the protection or conservation of forests, which are their own living systems and include the many layers and wide variety of plants living from the forest floor to the top of the canopy.



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	• 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.
	• Goals should reflect both conservation efforts and planned restoration activities on public and private lands.
	• Apply forest protection provisions at various stages in development:
	  • Preliminary site design – Identify high value woodland areas for preservation
	  • Identify specific trees to be preserved and specify protection methods. Measure canopy cover and/or caliper inches of trees to be removed and determine th method of replacing a comparable volume of forest cover on site or in a forest mitigation bank.
	  • Mandate protection of trees and avoidance of soil compaction during construction
	  • Monitor tree/forest health and require maintenance on an ongoing basis post-construction
	• View forest cover as infrastructure, and provide funds to maintain and improve your urban forest
	• Require developers to follow forest cover goals and integrate planting areas into parking lots to reduce runoff.

Zoning Appeals Boards	• Enforce codes that support preservation • If variances are allowed that remove forest cover, require mitigation
Administration, Economic Development, Community Development	• Work with private landowners to establish forest mitigation banks of land to accommodate replacement of lost canopy cover • Recognize the infrastructure value of woodlands and factor into the equation as assets
Tree Commissions	• Educate and encourage landowners to preserve, restore or increase tree and forest cover on private land • 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. • Attend ODNR Tree Commission Academy

KEY ROLES	KEY ACTIONS
Stewardship Groups	• Support forest preservation, and especially increased planting, throughout the community • Sponsor tree planting events, seedling giveaways, and adopt-a-forest programs • Work with governments and private landowners to designate planting sites. • 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.
Residents, Property Owners and Property Managers	• Retain and maintain forested areas, including tree canopy, understory and ground level vegetation. • Restore forested connections between segments of woodland to support wildlife habitat, establish greenways and improve forest function. • Do not rake leaves from woodlands. • Allow "volunteer" seedlings to grow. • Aim for at least 40% of property to be planted, to naturally revert to woodland. • Plant native trees and understory vegetation.
Developers	• Design sites to include ample forest cover, preferably in areas where they can reduce surface water runoff. • Incorporate trees throughout parking areas to absorb water 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. • Resist the temptation to rake and mulch under trees – use lower level plantings and ground cover that requires minimal maintenance and reduces root disturbance