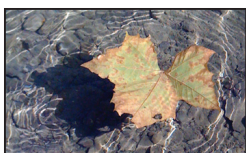


APPENDICES

- A. Draft & Resolutions of Adoption
- B. Assessing Wetlands for Restoration Potential
- C. Ohio Lake Erie Commission Balanced Growth Program - Fact Sheets & State Incentives
- D. Related Studies, Data and Reports



APPENDIX A
Draft Resolution

A RESOLUTION ADOPTING THE FURNACE RUN BALANCED GROWTH PLAN

- Whereas,* The State of Ohio, through the Ohio Lake Erie Commission's Balanced Growth Program, has identified the need to enhance protection of the State's waters and Lake Erie by supporting local governments to improve planning for development and conservation; and
- Whereas,* Furnace Run is an important part of the Cuyahoga River and Lake Erie ecosystem, providing storm water management, and important downstream recreational opportunities and wildlife habitat, including Metroparks Serving Summit County's Furnace Run Metropark and the Cuyahoga Valley National Park; and
- Whereas,* The Cuyahoga River Community Planning Organization has organized local government participation in the Furnace Run Watershed Planning Partnership and supported it in developing the Furnace Run Balanced Growth Plan that identifies priority areas for conservation and development; and
- Whereas,* The Furnace Run Watershed Partners and the Cuyahoga River Community Planning Organization are to seek endorsement of this Balanced Growth Plan by the Ohio Lake Erie Commission in order to permit the local governments in the watershed to seek the benefits and incentives provided by such endorsement; and
- Whereas,* The Priority Development Areas, Priority Conservation Areas and Priority Agricultural Areas identified in the Furnace Run Balanced Growth Plan are to be used by State of Ohio agencies to guide state activities and programs affecting these areas, and they will serve as the basis for special incentive programs to be directed to the Furnace Run watershed communities; and
- Whereas,* The designation of such areas and access to such benefits will assist the (City/Village/Township) of (_____) to minimize future flooding, erosion and water quality problems, threats to infrastructure, and reliance on costly engineered solutions to stormwater problems.

NOW, THEREFORE, BE IT RESOLVED BY THE (COUNCIL/TRUSTEES) OF _____
THAT:

Section 1. The ____ of _____ supports the Furnace Run Watershed Balanced Growth Plan and the Priority Development Areas, Priority Conservation Areas and Priority Agricultural Areas identified therein, and hereby adopts the Plan.

Section 2. The Cuyahoga River Community Planning Organization is directed to seek endorsement of this Balanced Growth Watershed Plan by the Ohio Lake Erie Commission in order to permit the local governments in the watershed to seek the benefits and incentives provided by this endorsement.

Section 3. The Priority Development Areas, Priority Conservation Areas and Priority Agricultural Areas identified in the Balanced Growth Watershed Plan are to be used by State of Ohio agencies to guide State activities and programs. They will also serve as the basis for special incentives programs to be directed to the Furnace Run watershed and the governmental jurisdictions within it.

Section 4. The _____ of _____ will consider changes to city regulations and policies necessary to implement Priority Areas and to act on the findings of additional natural resource and land use data, all to the maximum extent possible.

Section 5. The _____ of _____ will support and work collaboratively with the Furnace Run Watershed Partnership and the Cuyahoga River Community Planning Organization.

Section 6. It is found and determined that all formal actions of this Council concerning and relating to the adoption of this Ordinance were carried out in an open meeting of this Council and that all deliberations of this Council and any of its committees that resulted in such formal action took place in meetings open to the public in compliance with all legal requirements.

APPENDIX B

PRIORITIZING WETLAND RESTORATION POTENTIAL IN THE TRIBUTARIES OF THE CUYAHOGA RIVER AREA OF CONCERN (AOC)

•

Furnace Run

CUYAHOGA RIVER COMMUNITY PLANNING ORGANIZATION

JUNE 2008

Acknowledgments

Funding for this project was made possible by the Ohio Environmental Protection Agency. We would like specifically to thank Julie Letterhose and Kelvin Rogers from Ohio EPA, and for her technical assistance, Dr. Siobhan Fennessey from Kenyon College.

Table of Contents

INTRODUCTION • 6

Goals & Objectives

Study Area: Cuyahoga River Watershed & Area of Concern (AOC)

METHODS OF ANALYSIS • 15

Phase I: Analyze & Integrate Existing Wetland Data

Phase II: Developing the Cuyahoga River Wetlands Model Ranking System

FURNACE RUN WETLAND SITES • 21



INTRODUCTION

Many organizations and agencies in the region, when asked to identify wetland sites for conservation projects, focus primarily on opportunistic or “easy” sites. Opportunistic models lack the strategy to identify key wetland sites that provide optimal watershed benefits and tend to overlook long-term restoration potential of the site. With limited resources and funding for watershed protection, we need to be strategic in where and how we conserve our remaining wetlands.

Wetlands are complex and fascinating ecosystems that perform a variety of functions. Wetlands regulate water flow by detaining storm flows for short time periods. This reduces flood peaks and improves water quality by retaining or transforming excess nutrients and by trapping sediment and heavy metals. Wetlands also provide many other habitat and recreational benefits. However, not all wetlands perform all functions nor do they perform all functions equally well. The size and location of a wetland within a watershed determine its hydrologic and water-quality functions.

Since wetlands provide valuable ecosystem services, a watershed planning model is needed to strategically identify key wetlands for conservation. Systematically identifying and conserving such sites can help maximize stormwater management, non-point source pollution control and watershed protection efforts in the Cuyahoga River AOC.

Goals & Objectives

Goals

The goal of this project is to identify wetland sites to target for future conservation efforts. A ranking model has been developed to assist in identifying the “top wetland sites” in each tributary watershed of the Cuyahoga River AOC. By identifying wetland sites, this project will help expedite and focus efforts to meet mitigation needs, as well as make the best use of other public or private funding sources.

A watershed-level model was developed by using Geographic Information System (GIS) to identify wetland sites based on analysis of overall:

- 1) Watershed Performance- We identified key wetland sites based on a ranking system. The ranking system highlights wetland sites that are specifically important for managing water quality and quantity. Directing conservation efforts at these sites can help maximize the improvement of our stream resources.

We used a GIS to analyze several landscape variables on a watershed basis to help determine wetland performance. The size of a wetland, its location in the watershed, and other performance-based characteristics were considered. This kind of watershed analysis provides a means to prioritize conservation activities for organizations and agencies in the field of watershed protection.

The top wetland sites identified through the ranking system are then examined for restoration potential.

- 2) Restoration Potential- We analyzed land cover in the 50m buffer surrounding the key wetland sites. The intensity of land cover (measured in percent) surrounding a wetland affects restoration and enhancement options and influences the long-term effectiveness of projects. Many wetland functions are affected by land use activities; on the other hand these same functions can be enhanced or restored by addressing and minimizing the impacts from those same stressors. Restoration and enhancement options are examined in relation to land cover stressors. Options will be examined in the wetland itself and the land area or buffer around the wetland.

Options for restoration and enhancement are analyzed from field analysis data and/or aerial photography. Not all wetland sites in the study area have field data. However, when available, field data is the primary source for guiding conservation options. Aerial photography, supporting literature and best professional judgment will guide conservation options for wetland sites lacking field data.

We define restoration, enhancement, preservation, and conservation as:

- *Restoration* the rehabilitation of a degraded wetland or a hydric soil area that was previously a wetland.
- *Enhancement* means improving upon the function of an already existing wetland
- *Preservation* means the protection of ecologically important wetlands, other aquatic resources, or other natural habitats in perpetuity through the implementation of appropriate legal and physical mechanisms.
- *Conservation* refers to any one or combination of: restoration, enhancement and preservation.

Objectives

The objectives in this project included:

1. Identify all existing wetlands in each tributary watershed. This involves gathering and integrating data from multiple credible sources.
2. Develop a ranking methodology to prioritize all the wetland sites, within each tributary, based on water quantity and quality performance.
3. Identify the top ten wetland sites in each of the eleven tributary watersheds to the Cuyahoga River in the AOC, with a goal of 110 wetland project sites assembled.
4. Establish restoration and enhancement options for each wetland site.
5. Assemble a library of cost estimates for the various types of conservation options.

Detailed Site Descriptions

Each selected wetland site has a detailed site description. Due to the multiple data sources used for this project some sites may have more detailed data than others, such as field visit observations.

The detailed site description includes:

- Map of Wetland- Orthophoto basemap with:
 - Wetland Boundary
 - Streams
 - Parcel Lines
 - Roads
- Wetland Classification- Hydrogeomorphic and/or Cowardin Class (based on plant community type)
- Size- acreage
- Ohio Rapid Assessment Method (ORAM) Score: Indicates wetland ecological condition: Category 3 (High), Category 2 (Medium), Category 1 (Low)
- Wetland Buffer Condition- Surrounding 50m Buffer (forest cover quantity)
 - Based on Forest Cover Condition Category
 - >75-100% Forest Cover- “High Quality
 - >50-75% Forest Cover- “Moderate Quality”
 - 25-50% Forest Cover-“Low Quality”
- Ownership- Public or Private
- Number of Parcels- An indication the of possible number of owners
- Impacts- Stressors identified during Field Visits (if available)
- Restoration Potential- Restoration, Enhancement or Preservation
- Cost Estimates- Estimated costs for restoration or enhancement options
- Latitude/Longitude- lat/long was established by calculating the centroid point of the wetland polygon
- Community- Local jurisdiction of the wetland site

Classification

Cowardin wetland classifications identified in this study include palustrine emergent (PEM), these are marshes and wet meadows; palustrine scrub/shrub (PSS), which are wetlands dominated by shrubs and saplings; and palustrine forested (PFO), that include all forested wetlands.

Common species in the PEM (emergent) and PSS (scrub/shrub) wetlands include:

- *Cornus amomum* (silky dogwood)
- *Viburnum recognitum* (northern arrow-wood)
- *Rhamnus frangula* (European buckthorn)
- *Ulmus americana* (American elm)
- *Fraxinus pennsylvanica* (green ash)
- *Euthamia graminifolia* (fragrant flat-topped goldenrod)
- *Aster* spp. (asters)
- *Onoclea sensibilis* (sensitive fern)

- *Typha* spp. (cattails)
- *Leersia oryzoides* (rice cutgrass)

Common species found in the PFO (forested wetlands) include:

- *Ulmus americana* (American elm)
- *Fraxinus pennsylvanica* (green ash)
- *Acer rubrum* (red maple)
- *Glyceria striata* (fowl manna grass)
- *Rhamnus frangula* (European buckthorn)
- *Viburnum recognitum* (northern arrow-wood)
- *Carex* spp. (wetland sedges)

Hydrogeomorphic classification organizes wetlands based on hydrology and geomorphology.

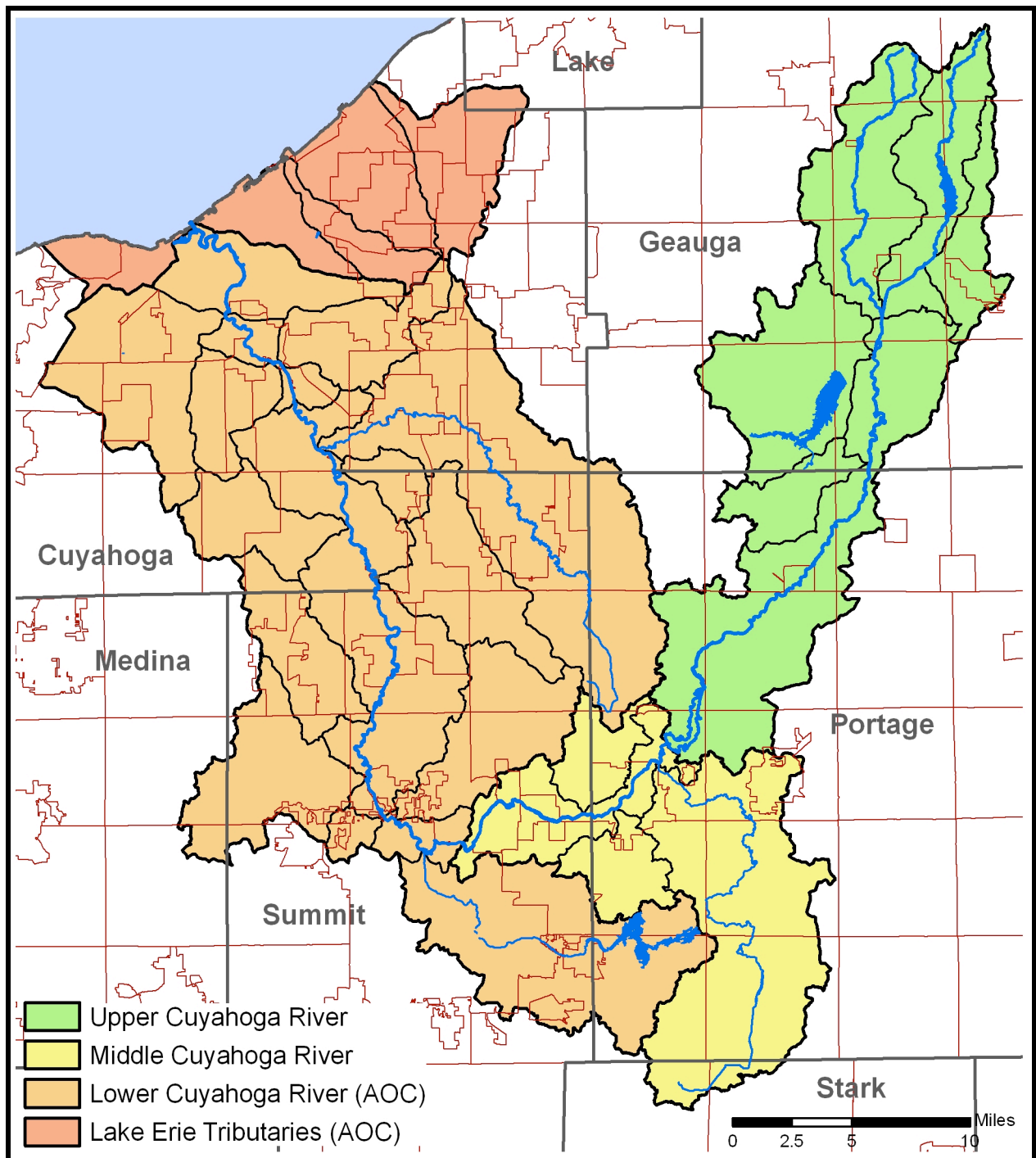
1. Depression (Permanent inundation / Regular inundation / Seasonal inundation / Seasonal saturation)
2. Impoundment (Beaver / Human)
3. Riverine (Headwater / Mainstem / Channel)
4. Slope (Headwater / Mainstem / Isolated / Fringing)
5. Fringing (Reservoir / Natural lake)
6. Bog (Strongly ombrotrophic / Moderately ombrotrophic / Weakly ombrotrophic)
(Ombrotrophic ("cloud-fed") refers to soil or vegetation which receive all of their water and nutrients from precipitation, rather than from streams or springs.)

This model, developed for the Cuyahoga River, serves as an initial study that can be expanded and improved upon as newer data becomes available for each tributary watershed. Our model could be easily applied or adapted in different watershed settings and prove useful for other organizations and agencies. This study was undertaken to address the problems of stormwater quantity, water quality degradation and dwindling wetland habitat.

Study Area: Cuyahoga River Watershed & Area of Concern

The U-shaped Cuyahoga River basin, located in northeast Ohio, drains 813 square miles and includes 1,220 stream miles spanning parts of 83 local jurisdictions and 6 counties. The Cuyahoga River Watershed is organized into three sections: Upper River (Geauga and Portage Counties), Middle River (Portage and Summit Counties) and Lower River (Summit and Cuyahoga Counties). The Lower Cuyahoga River is part of the Area of Concern (AOC) designation. (See Map 1 on next page.)

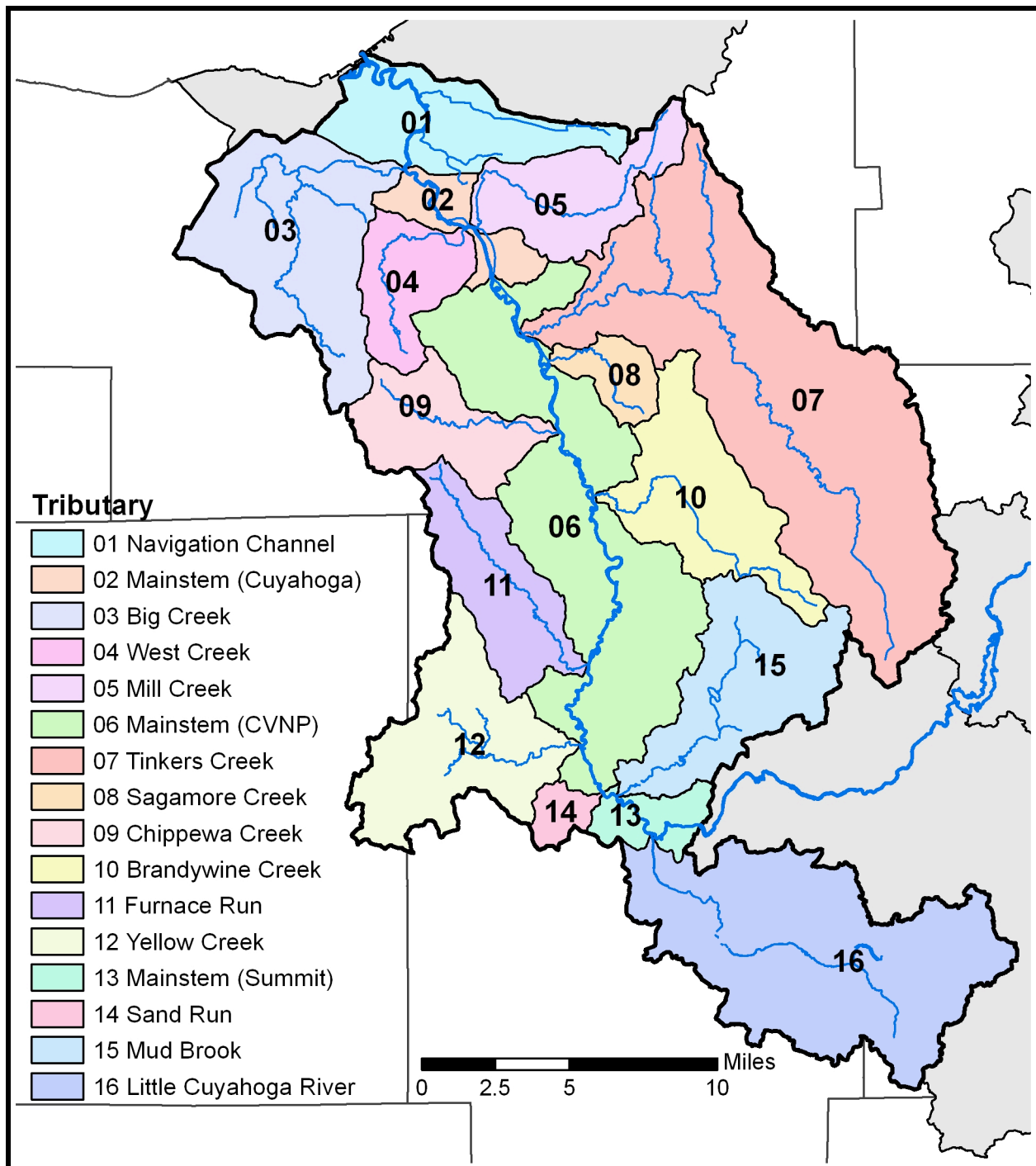
The river's headwaters originate in northeastern Geauga County and flow southwest to Akron. The river turns sharply to the northwest at the confluence with the Little Cuyahoga River in northern Akron, and then winds through the Cuyahoga Valley National Park before reaching the City of Cleveland and emptying into Lake Erie. The geo-political complexity of the watershed adds a unique dimension to achieving sustainable improvements in water quality.



Map 1: Cuyahoga River Watershed and Lake Erie Tributaries

Land use patterns vary greatly throughout the Cuyahoga River Watershed. The Upper and Middle River are still relatively healthy with an abundance of wetlands and a State Scenic River designation. The health of the Upper River can be attributed to a low level of urban development and 19,000 acres the City of Akron has preserved for drinking water purposes. Organic and nutrient enrichment, flow and habitat alterations are cited as the

primary pollutants or impacts in these reaches, which restricts sections of the river from meeting Ohio EPA's water quality standards. The major sources of these impacts come from channelization, home sewage treatment systems, reservoirs and agriculture.



Map 2: Lower Cuyahoga River Watershed Tributaries within the Area of Concern

Cuyahoga River Area of Concern (AOC)

The lower 50 miles of the Cuyahoga River and its tributary watersheds between the city of Akron and Cleveland are part of the Area of Concern. The Lower River is among the most densely populated and industrialized urban areas in the state. In 1985, the International Joint Commission identified the area from the Ohio Edison Dam to the mouth and the Lake Erie near-shore areas as one of 43 Areas of Concern on the Great Lakes. In 1988, a Remedial Action Plan (RAP) was formed to address pollution problems affecting the Lower River's beneficial use impairments. This includes concerns about the health and habitat of fish and other aquatic life, limited recreation and public access to the river and harbor areas and human health and socio-economic concerns. The primary pollutants or impacts that restrict the Lower River and its tributaries from meeting Ohio EPA's water quality standards include organic and nutrient enrichment, low dissolved oxygen, toxicity, sedimentation, and habitat degradation. Sources of these impacts include combined sewer overflows, urban development and stormwater runoff. Twenty-two miles of the Lower Cuyahoga River flow through the Cuyahoga Valley National Park, before entering the 5.6 mile Navigation Channel and discharging into Lake Erie.

Wetland Resources in the Area of Concern

Recent studies have shown that wetland resources are scarce, the majority are small (≤ 1 acre), privately held and are showing signs of stress from the surrounding development. All together, this presents many challenges from accessing property to addressing land use stressors in order for restoration to occur.

Mack et al (2007) found that the ecological condition of wetlands deteriorates from the Upper and Middle to the Lower Cuyahoga River watershed. There are two indicators of this trend: the number of high quality (Category 3) wetlands and the acreage of low quality wetlands.

The first indicator is a *decrease* in the number of high quality wetlands from Upper to Middle to Lower portions of the watershed. In the Upper watershed, in Geauga county, 49.3% of the wetlands were Category 3. While in the Middle watershed, in Portage and Summit counties, 18.5% and 19.6% of the wetlands were Category 3. The Lower Cuyahoga River Watershed (AOC) had merely 8.3% of its wetlands as Category 3.

The second indicator is the *increase* in acreage of lower quality Category 1 and Modified Category 2 wetlands from Upper to Middle to Lower portions of the watershed. Category 1 and Modified Category 2 combined represent 4.5% and 5.6% of wetland acres in the Upper and Middle portions of the watershed, respectively. While in the Lower Cuyahoga River Watershed (AOC) 19.3% of the wetland acres are Category 1 and Modified Category 2. The ecological conditions of wetlands in the Lower Cuyahoga River Watershed are due to the relatively small wetland sizes and fragmented landscapes within the AOC.

Causes & Sources of Degradation

There is an inverse relationship between the quality of a wetland and the number of land use stressors. Category 3 and 2 wetlands have a lower number of hydrologic and habitat stressors compared to a higher number of stressors found at Category 1 and Modified Category 2 wetland sites. In the Cuyahoga River Watershed the most important hydrologic stressors related to condition were ditching, dikes, stormwater input, filling, and roads.

Habitat Stressors in the Cuyahoga River Watershed												
Region of Watershed	Mowing	Grazing	Clear Cutting	Select Cutting	Woody Debris Removal	Sedimentation	Toxic Pollutant	Shrub Removal	Aquatic Bed Removal	Farming	Nutrient Enrichment	Dredging
Upper River	32%	4%	4%	15%	5%	4%	1%	11%	0%	5%	4%	6%
Middle River	25%	4%	4%	10%	12%	16%	1%	12%	1%	14%	18%	8%
Lower River (AOC)	29%	2%	2%	16%	9%	13%	2%	11%	0%	13%	11%	9%

Hydrologic Stressors in the Cuyahoga River Watershed									
Region of Watershed	Ditching	Tiling	Dikes	Weirs	Stormwater Input	Point Source	Filling	Roads	Dredging
Upper River	33%	5%	12%	3%	10%	0%	18%	29%	3%
Middle River	27%	1%	4%	0%	6%	3%	31%	40%	6%
Lower River (AOC)	27%	7%	13%	2%	4%	2%	24%	38%	7%

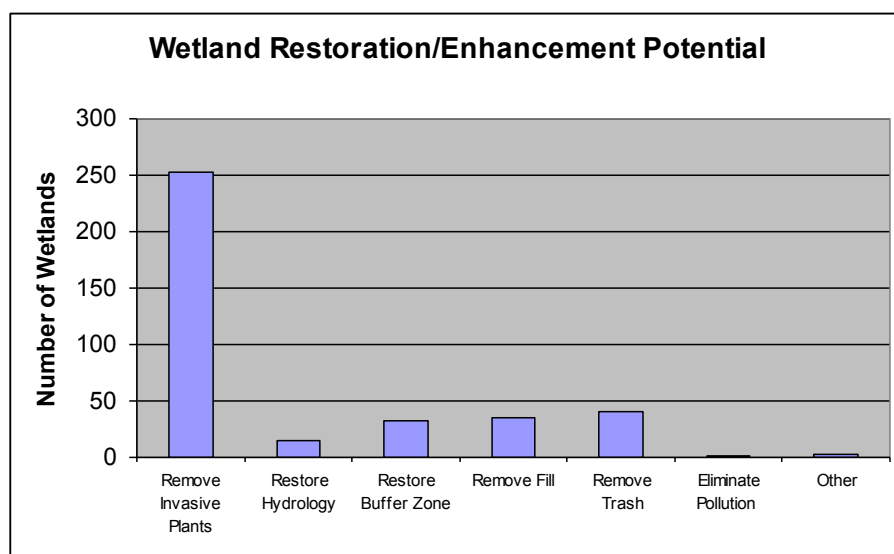
A 2002-03 field analysis of wetlands in the Lower Cuyahoga River showed adjacent land use as the most commonly noted impact. In most cases, this was the result of development on the adjacent land. Impacts associated with development of adjacent land include destruction of the buffer zone, isolation from adjacent natural areas, and runoff from lawns and impervious surfaces.

Another commonly noted impact is addition of fill. The old fill occurs mostly in small, isolated areas. The fill consists of subsoil, concrete, block, brick, and household debris. Some of the filled areas may contain hazardous waste or other unknown materials; on-site

testing would be required to determine actual contents. In most areas, the extent and thickness of the fill is difficult to determine because of its age. New fill is in many cases associated with recent development projects.

Scattered debris, such as bottles, cans, tires, furniture, appliances, and car parts, is common within the wetlands, particularly the floodplain areas where these items are deposited by flood waters. Household dumps ranging in age from around 1880 to the present were found throughout the study area. These dumps tend to occur near old house sites, in ravines, and along roadsides. Dumping was noted where relatively large areas of household debris appear to have impacted the wetlands.

Drainage ditching and drainage tiling were observed in some areas. The ditches and tiles are old, and, in most cases, are only partially functioning to drain wetlands. Most of the ditches and tiles were associated with former agricultural fields. It is likely that tiles exist in more areas than noted. Tiled areas are not easy to identify without a more detailed study. Table 6 provides a summary of wetlands impacts identified in the field (Cuyahoga River RAP 2003).



The Cuyahoga River AOC- Priority Area for Wetland Mitigation

The current mitigation rules do not adequately address the inequity of mitigation that occurs in the Cuyahoga River Watershed. A recent study shows that the Cuyahoga River Watershed has experienced a net loss of wetland acres due to the exportation to mitigation banks located outside the watershed. Furthermore, the majority of projects (67%) that restored or created wetlands independently (not a wetland bank) inside the watershed were not successful at meeting permit requirements (Kettlewell et al. 2008).

Mitigation has evolved into a barter system where the scales are tipped in favor of higher quality, rural watersheds; leaving the move heavily degraded urban watersheds at a disadvantage. Mitigation rules require that restoration projects must be available for a

developer to mitigate. However, eligible projects that do exist in the Cuyahoga River AOC sub-watersheds are generally:

- 1) Very expensive, and
- 2) Above and beyond the requirements a typical developer would need to compensate for their impacts.

This in addition to the cheaper property values that exist outside the AOC makes it more economical for developers to perform mitigation outside the Cuyahoga River Watershed and therefore, far removed from the initial impact. The AOC needs to be a Priority Area for Compensatory Mitigation. We must have a net gain in high quality habitat to help improve watershed resources and move toward delisting.

This project identifies mitigation projects for each tributary watershed in the Lower Cuyahoga River Watershed, making in-kind mitigation within in the HUC-12 unit possible.

METHODS OF ANALYSIS

Phase I- Collect, Analyze & Integrate Existing Wetland Data

Summary of Wetland Data Sources

Each of the files listed below exists as a separate GIS polygon file.

1. Ohio EPA & Cuyahoga River RAP ORAM Analysis Summer 2005
 - Actually two projects completed together:
 - Ohio EPA project covers the entire Cuyahoga River Watershed
 - RAP project is a more in-depth analysis of three tributaries to the Cuyahoga River
2. Cuyahoga River RAP & Davey Resource Group Study 2001-03
 - Interpretation of aerial photos (1993-Cuyahoga County Engineer) & field work December 2002–April 2003
 - Covers only the Cuyahoga County portion of the Cuyahoga River Watershed
3. Cleveland Metroparks ORAM analysis Summer 2005 & 2006
 - Covers park reservations in Cuyahoga County portion of the Cuyahoga River Watershed
 - Follows same protocols as Ohio EPA & Cuyahoga River RAP ORAM project
4. Davey Resource Group Summit County Wetlands Project 2000
 - Interpretation of orthophotos photos (2000-Summit County Engineer)
5. Portage County Natural Resource Inventory compiled by Davey Resource Group, Inc
 - Interpretation of aerial photos (ASMAT 2000) & field work in 2004 & 2005
6. Cuyahoga Valley National Park Wetlands Inventory (covered in Summit County file)
7. Metroparks Serving Summit County Wetlands Project (covered in Summit Co. file)

In order to produce the best quality model for each tributary watershed, each data source, or GIS file, was divided into tributary watershed files, and then each set of

tributary watershed files was combined and then updated to the 2006 orthophotos provided by Ohio DNR. In areas where wetland boundaries overlapped, ORAM boundaries were kept and others were edited.

Phase II- Developing the Cuyahoga River Wetlands Model Ranking System

The basic premise of the Cuyahoga River Wetland Model is to numerically evaluate conservation alternatives by developing a set of criteria that can be used to judge each wetland. Each criterion was assigned either a positive or negative point range that reflects its importance to the function or dysfunction of the wetland within the tributary watershed. Each wetland earns numerical scores that depend on how well the wetland meets that particular criterion. The positive and negative points are each summed separately for each wetland. For the purpose of this project, the numeric totals for each potential conservation site were compared with all other sites within the tributary watershed and then a rank order was assigned. The rationale for the scoring system was to equate high positive scores with the most important wetland sites, while keeping separate negative scores that indicate the amount of stressors for each wetland.

The model is broken into two categories:

Positive Attributes looked at specific criteria that were both useful in evaluating a wetland's ecological importance and were supported in scientific literature. We used a Geographic Information System (GIS) to analyze several landscape variables on a watershed basis as indicators of wetland performance. Three of the variable pertained to the wetland itself: wetland size, proximity to riparian corridor, and proximity to mapped flood zones. Two other variables pertained to the 50m buffer surrounding the wetland: the amount of area of other wetlands within the buffer, and the overall quality of the buffer based on the percent of forest cover area in the buffer.

The top wetland sites identified through the ranking system are then examined for Stressor Attributes which helps identify restoration potential.

Stressor Attributes included the wetland's proximity to roadways and three types of land cover in the 50m buffer surrounding the wetland sites. The percent of urban, residential and agricultural land covers were analyzed, since the intensity of these land uses surrounding a wetland affects restoration and enhancement options and influences the long-term effectiveness of the project.

Additional options for restoration and enhancement are gathered from either field analysis data or aerial photography. Not all wetland sites in the study area have field data. However, when available, field data is the primary source for guiding conservation options. Orthophotography (2005), supporting literature and best professional judgment will guide conservation options for wetland sites lacking field data.

MODEL RANKING SYSTEM

CUYAHOGA RIVER WETLANDS MODEL			
POSITIVE ATTRIBUTES (+)		STRESSORS (-)	
Wetland Size Groups	Points	LAND COVER	
<.5 acre	0	Urban Area in 50m Buffer	Points
>.5-1 acre	1	>75% thru 100%	-7
>1 thru 5 acres	2	>50% thru 75%	-6
>5 thru 10 acres	3	25% thru 50%	-5
>10 thru 20 acres	4	Residential Area in Buffer	Points
> 20 thru 100 acres	5	>75% thru 100%	-6
>100 thru 150 acres	6	>50% thru 75%	-5
>150 thru 200 acres	7	25% thru 50%	-4
>200 thru 250 acres	8	Agriculture Area in Buffer	Points
>250 thru 300 acres	9	>75% thru 100%	-3
>300 acres	10	>50% thru 75%	-2
Wetland's Proximity to Riparian Setback	Points	25% thru 50%	-1
Beyond 100m	0	Wetland's Proximity to Roadways	Points
75m thru 100m	1	0m thru 25m	-6
50m up to 75m	2	25m thru 50m	-5
25m up to 50m	3	50m thru 75m	-4
0m up to 25m	4	75m thru 100m	-3
Intersect with	5	100m thru 125m	-2
Fully within	6	125m thru 150m	-1
Wetland's Proximity to Flood Zones	Points	>150m	0
None	0		
Intersect with	1		
Fully within	2		
Forests in Buffer of Wetland			
>75% thru 100%	5		
>50% thru 75%	4		
25% thru 50%	3		
Other Wetland Area in Buffer	Points		
61% thru 100%	3		
26% thru 60%	2		
4% thru 25%	1		

Rationale for the Cuyahoga Model

Size (*Wetland Size*)- Larger wetlands are better protected from the negative impact of external inputs. This is due to the greater distance between the core habitat and input sources, and larger areas of vegetation that can act as sediment and nutrient sinks.

Hydrology (*Proximity to Riparian Corridor and/or Flood Zone*)- For the purpose of this project, we identified wetlands associated with the riparian corridor and 100 year flood zone. In most cases these wetlands could be classified as riverine wetlands. “Riverine” refers to a class of wetlands that has a floodplain or riparian geomorphic setting with a dominant water source being over bank flow. These types of wetlands are especially valuable in their ability to absorb stormwater and slow the discharge of stormwater downstream (Krieger 2001). An urban wetlands study (Mack et al. 2007) found that riverine wetlands were clearly valuable in desynchronizing stream flood events (ie. capturing and slowly releasing precipitation). Desynchronizing helps to alleviate large peak flows in streams, which minimizes flooding and erosion downstream.

Vegetative Cover (*Forest Cover in Wetland Buffer*)- Houlihan et al. (2006) found a relationship between forest cover and exotic plant species richness, suggesting that loss of forest cover facilitates the infiltration of exotic plant species. The amount of natural vegetation adjacent to a wetland affects the quantity and quality of surface runoff in a wetland, particularly nutrient and sediment loads. In Wardrop et al. (2007) they developed a landcover condition category for forest cover surrounding wetlands. We adapted their category table for this project and rated forested cover by “High, Moderate and Low” quality.

Wetland Connectivity (*Other Wetlands within Buffer*)- Fennessey, Sullivan 2008 found a correlation between predicting ecological condition of a wetland and the presence of other wetlands located within the surrounding 50m buffer. This “wetland connectivity” is quite possibly functioning as a complex of wetlands, providing a buffering effect from upland stressors and enhancing watershed benefits.

Stressors

Land Cover- Research shows that surrounding land-use affects ecological condition of a wetland. The condition of a wetland declines significantly as the surrounding land use changes from natural to urban. This is demonstrated by the change of wetland conditions from the Upper to the Lower Cuyahoga River Watershed. Research by Fennessey & Sullivan (2008) examines this issue by analyzing land-uses within different size buffers (30m 50m, 100m, 500m, 1000m) around the wetlands. Results show that land use characteristics in the 30m and 50m buffers had the strongest correlation with ecological condition of a

wetland. This indicates that preservation of the buffer areas around wetlands can offer substantial protection and dramatically increase their conservation value.

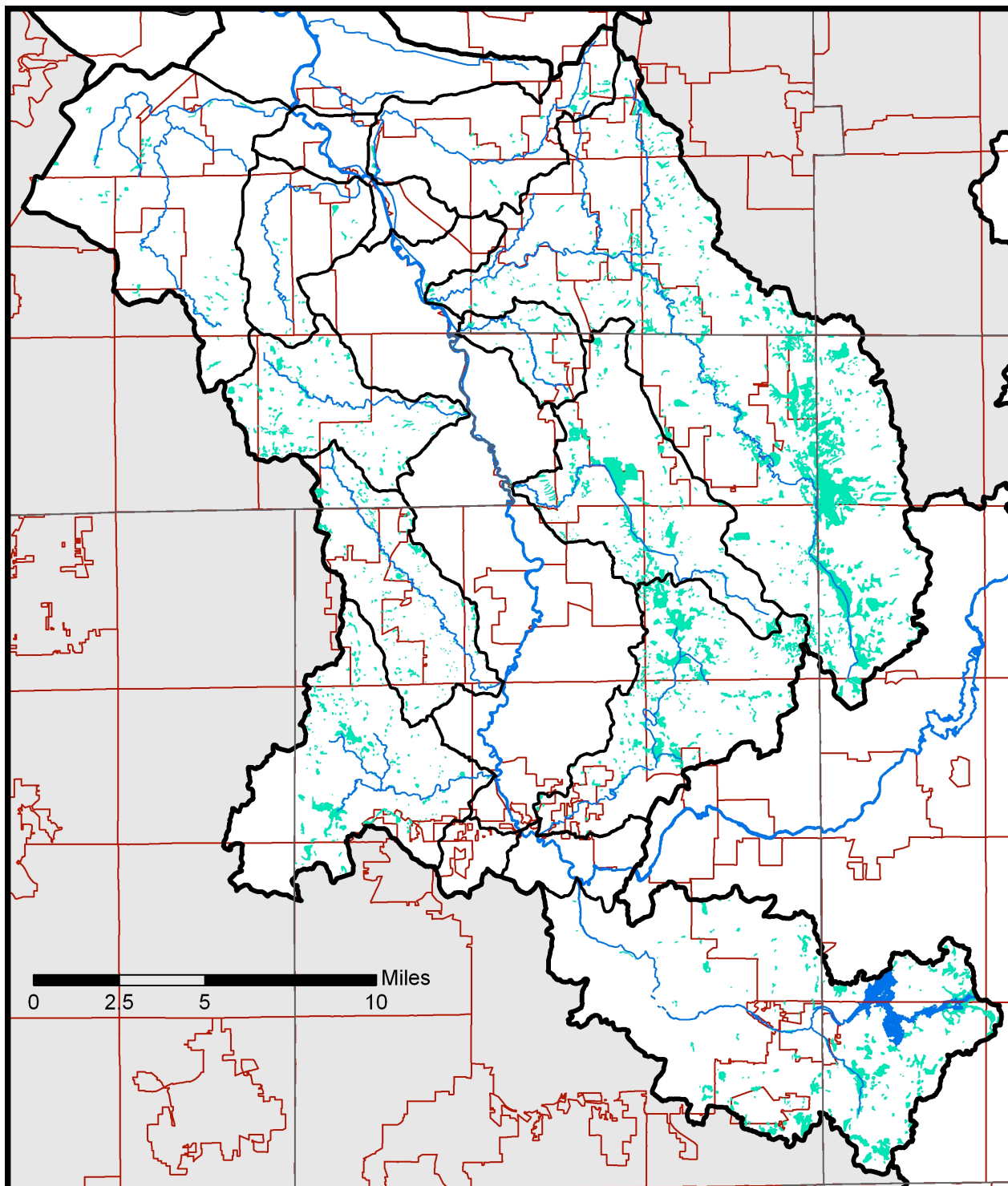
For the purpose of the project, the land cover scoring coefficients were adapted from the Landscape Development Intensity (LDI) index. LDI integrates the impacts of human land use on a given site (Brown and Vivas 2005).

Distance to Roadways- Proximity of wetlands to road systems is correlated with higher levels of polluted runoff, and poorer water and sediment quality. There is evidence that wetlands located downstream of a road system are at an increased risk of receiving sodium, potassium and nitrate pollutants (Houlahan and Scott 2004). These pollutant loadings result from road salt applications and soil erosion due to increased stormwater runoff. The ranking model provides a range of negative scores based on a wetland's distance to a roadway. The closer a wetland is to a roadway, the higher the risk of impacts from polluted runoff and therefore the more negative the score.

RESULTS & SELECTION OF WETLAND SITES

The study identified a total of 3,007 wetlands covering 9,710 acres within the tributary watersheds of the Cuyahoga River Area of Concern. All of the wetlands were analyzed within the context of their individual tributary watershed. Together, the top wetlands of each tributary watershed received further examination. These wetlands are highlighted in this report. 2459 acres of wetlands or 25.3% of total AOC tributary wetlands as part of the wetland analysis.

Wetlands Summary- Cuyahoga River Area of Concern (AOC)	
Total Number of Wetlands	3,007
Total Acres of Wetlands	9,710
Average Wetland Size (acres)	2.4
Average Wetland Buffer Condition (Percent Forest Cover)	Low Quality (25- 50%)
All Top Selected Wetlands Total Acres (160 total)	2473
All Top Selected Wetlands Average Size (acres)	22.3
All Top Selected Wetlands Average Buffer Condition (Percent Forest Cover)	High Quality (>75-100%)
Total Restoration Potential Costs	\$17,522,144



Map 3: Wetlands in the Tributaries of the Lower Cuyahoga River Watershed Area of Concern



FURNACE RUN

General Watershed Characteristics

Furnace Run is one of healthiest, 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. Furnace Run originates in Brecksville, Broadview Heights and Richfield in northern Summit and southern Cuyahoga counties in northeast Ohio. It flows approximately 10.4 miles southeast through Bath and Boston townships to meet the Cuyahoga River at river mile (RM) 33.08.

Location: Northeast Ohio, Summit County and a small portion of Cuyahoga County, including the communities of Brecksville, Broadview Heights, the Village of Richfield, Richfield Township, Bath Township and Boston Township

Characteristics:

Drainage: Drains approximately 20.34 square miles

Length: approximately 10.4 miles long

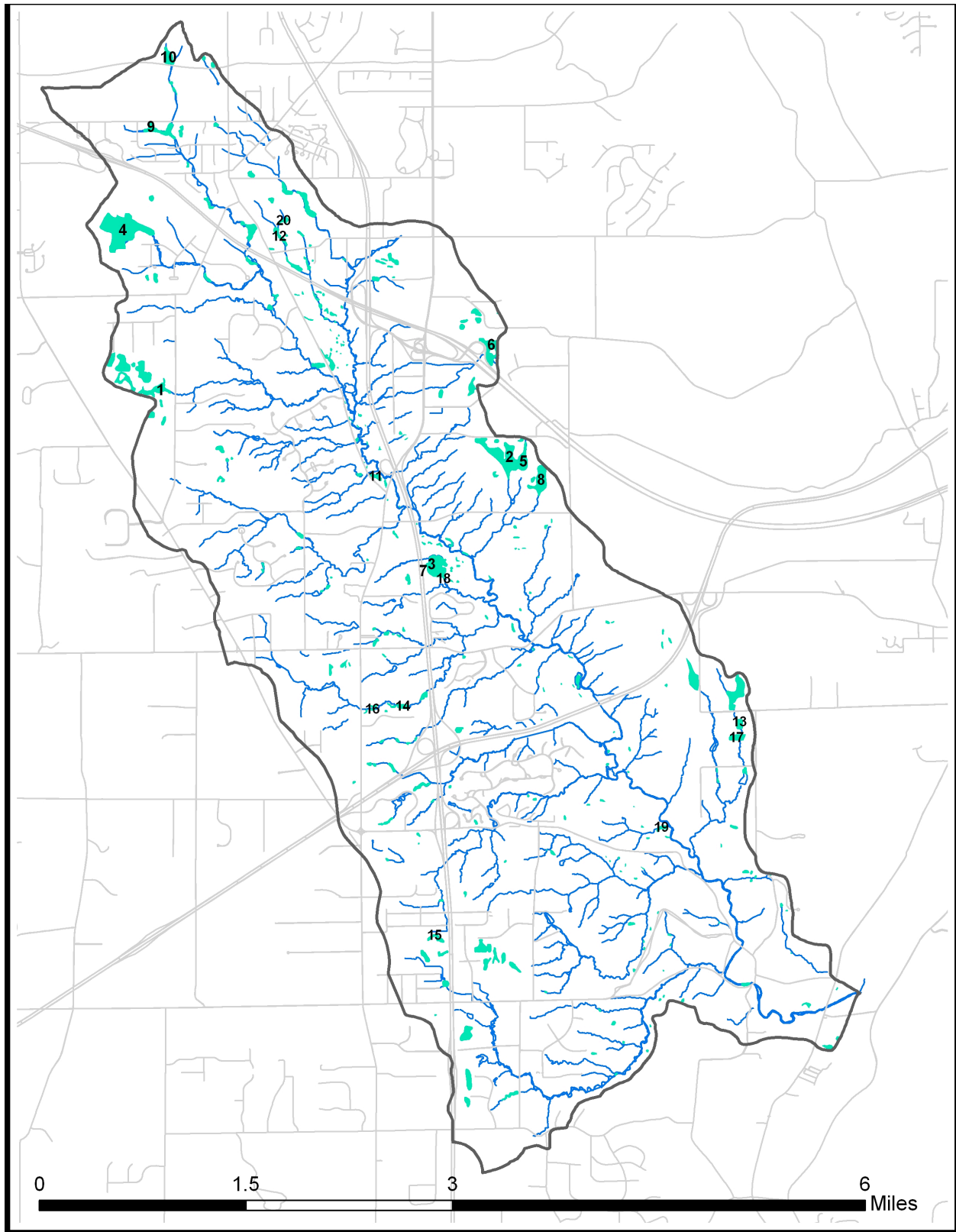
Gradient: Changes in elevation from 1252ft to 691ft, dropping 561 feet on its way to its confluence with the Cuyahoga River at River Mile 33.08 in Boston Township. Its average fall is 54 feet per mile.

Land Cover Characteristics (2001)	Percent of Drainage Area
Urban	14.11
Grass & Agriculture	34.42
Shrub & Scrub Cover	6.68
Wooded	47.13
Barren & Misc.	1.84
Streams & Surface Water	.24

Wetlands Summary- Furnace Run	
Number of Wetlands	301
Total Acres	253.09 acres
Average Size	0.84 acres
Average Wetland Forested Buffer Condition	Moderate Quality (>50-75%)
Top Ten Wetland Acres	96.4 acres
Top Ten Average Size	8.76 acres
Top Ten Average Wetland Buffer Condition	High Quality (>75-100%)
Total Restoration Potential Costs	\$597,456

Furnace Run Wetland Results

A total of 253 acres of wetlands were identified in the Furnace Run Watershed. Through our analysis we picked the top 10 wetlands sites. These 10 wetlands sites equaled approximately 96 acres, or nearly 38% of the total wetland acreage in the watershed. In the sites chosen, wetland sizes ranged from 32 acres to 1 acre.



Furnace Run Watershed Wetlands Locator Map

Furnace Run Watershed Wetland Maps

Furnace Run Watershed Wetlands Locator Map	
Furnace Run Wetland Ranked #1: SumDRG_FR11	Scale: 1:7,000
Furnace Run Wetland Ranked #2: SumDRG_FR253	Scale: 1:8,000
Furnace Run Wetland Ranked #5: SumDRG_FR252	Scale: 1:5,000
Furnace Run Wetlands Ranked #3: SumDRG_FR250	Scale: 1:5,000
Furnace Run Wetland Ranked #7: SumDRG_FR251	Scale: 1:5,000
Furnace Run Wetland Ranked #4: RAP9771	Scale: 1:8,000
Furnace Run Wetland Ranked #6: SumDRG_FR40	Scale: 1:5,000
Furnace Run Wetland Ranked #8: SumDRG_FR27	Scale: 1:5,000
Furnace Run Wetland Ranked #9: RAP695	Scale: 1:3,000
Furnace Run Wetland Ranked #10: RAP437	Scale: 1:5,000
Furnace Run Wetland Ranked #11: SumDRG_FR90	Scale: 1:5,000
Furnace Run Wetland Ranked #12: RAP698	Scale: 1:5,000
Furnace Run Wetland Ranked #13: ORAM2343 (FRW Ranked #17: SumDRG_FR144)	Scale: 1:5,000

Ranked #1: WETLAND ID# SumDRG_FR11	
Site Description	
Wetland Classification (<i>Hydrogeomorphic or Cowardin</i>)	Palustrine Forested (PFO)
Size (<i>acres</i>)	5.93
Wetland Buffer Condition	High Quality
Impacts (<i>Field Assessments</i>)	N/A
Restoration Potential	Remove Invasive Plants* Riparian/Wetland Plantings*
Ownership (<i>Public or Private</i>)	Private
Number of Parcels	6 Parcels / 6 Property Owners
Cost Estimates	\$9,896
Location (Lat/Long)	41.26725666 / -81.66622902
Community	Richfield Township

* Extrapolated Restoration Potential

Wetland SumDRG_FR11 is a 5-acre, forested wetland located in the headwaters of the Furnace Run Watershed. Notable features include a headwater stream, a well forested buffer zone and a other wetlands surrounding this site, creating a good headwater wetland complex. Wetland SumDRG_FR11 is in Richfield Township. Ownership complexity is relatively moderate with 6 parcels and 6 property owners.

Wetland SumDRG_FR11 is most likely a high to moderately high quality wetland. This is in consideration of the limited surrounding land uses, the high quality forested buffer and the adjacent wetlands providing a buffering effect. From 2000 to 2006 very little to no land use changes occurred. This wetland is also located in the riparian corridor. Additional studies may show that the adjacent wetlands are indeed part of the same wetland system.

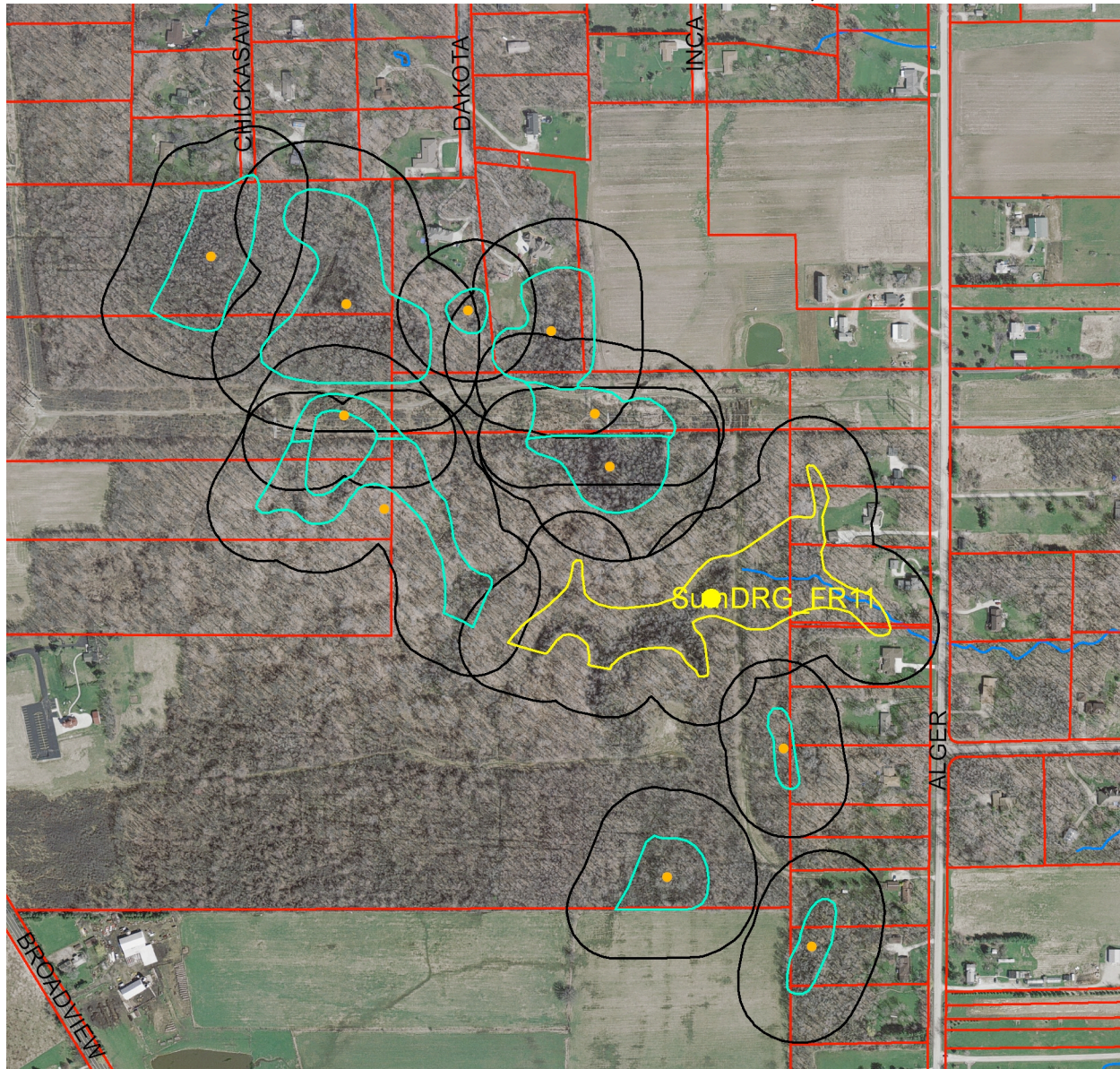
Next steps include a more detailed site assessment of this wetland. The site assessment should include an ORAM and Penn State Stressor Checklist completed. This will help provide the location and extent of surrounding impacts, restoration potential and ultimately cost estimates. Preliminary cost estimates for this site are based on and extrapolated from previous wetland assessment projects. A future enhancement project should include preserving this wetland. Discussions should begin with the property owner Serbian Orthodox Diocese, who own 95% of the site. Easements should also be explored for the back lots of the residential properties. Other options include removing invasive plant species and planting riparian/wetland plants.

Cost Estimate

Item	Unit Cost	Unit	Cost
Detailed Sight Assessment	\$720	1	\$720
Plans & Specification	\$5,000	1	\$5,000
Remove Invasive Plants	\$220	0.8acres	\$176
Seeding / Wetland Plantings	\$5,000	0.8acres	\$4,000
Conservation Easement	\$\$\$	5.93acres	\$\$\$

TOTAL

\$9,896



Furnace Run Wetland Ranked #1: SumDRG_FR11

Scale: 1:7,000

Map Key

- Yellow Lines -Wetland boundary
- Yellow Points -Centroid point calculated from wetland polygon
- Black Lines -Wetland 50m buffer
- Green Lines -Other wetlands
- Blue Lines -Streams
- Red Lines -Parcel boundaries

- Base Layer -Ohio 2006 orthophotos
- Projection -Ohio State Plane North, NAD83

Ranked #2 & #5: WETLAND ID# SumDRG_FR253 and SumDRG_FR252	
Site Description	
Wetland Classification (<i>Hydrogeomorphic or Cowardin</i>)	Palustrine Forested (PFO)
Size (<i>acres</i>)	22.02
Wetland Buffer Condition	High Quality
Impacts (<i>Field Assessments</i>)	N/A
Restoration Potential	Remove Invasive Plants* Riparian/Wetland Plantings*
Ownership (<i>Public or Private</i>)	Public & Private
Number of Parcels	2 Parcels / 2 Property Owners
Cost Estimates	\$12,296
Location (Lat/Long)	41.25987979 / -81.61726877
Community	Richfield Township

* Extrapolated Restoration Potential

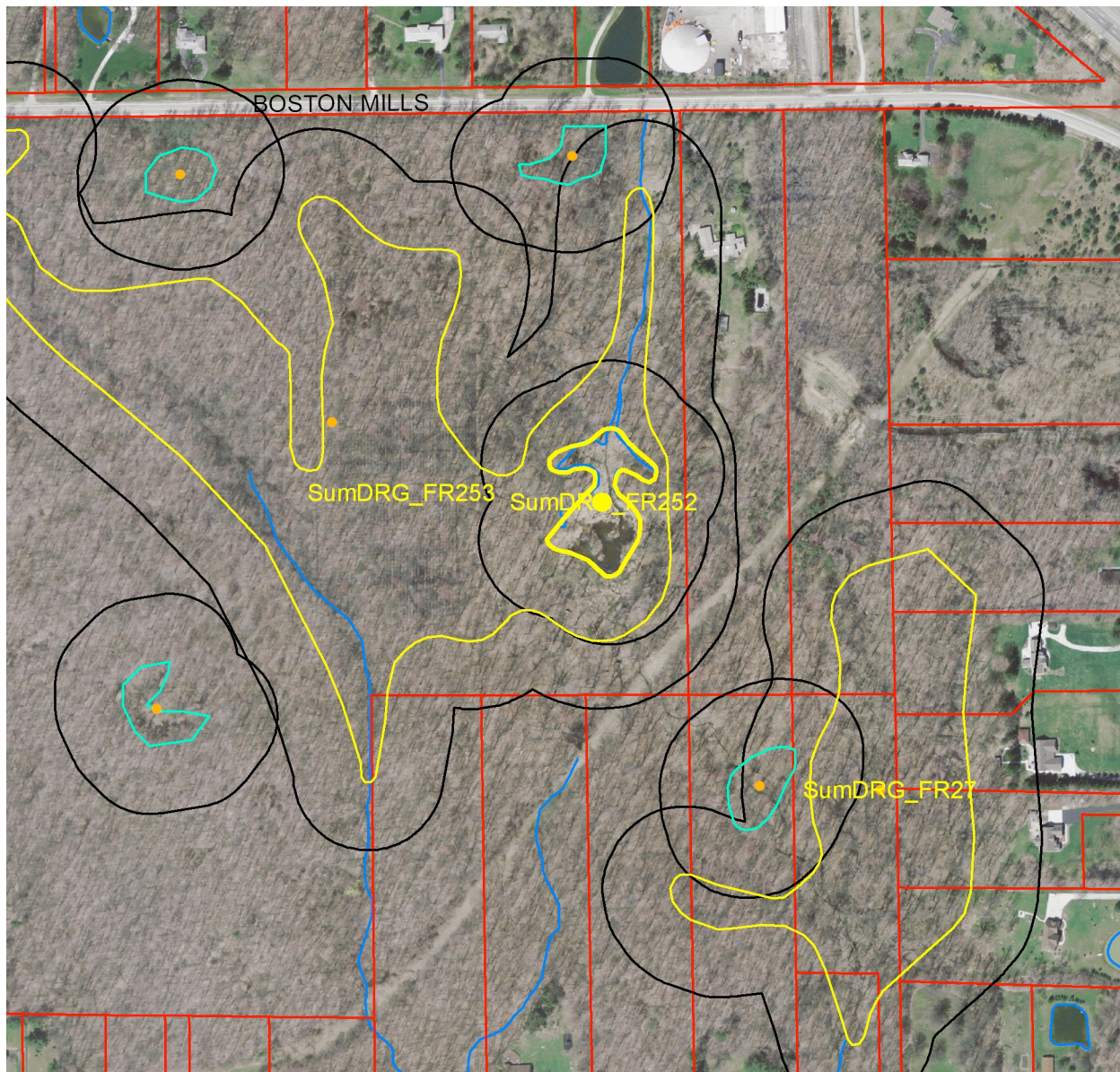
Wetland SumDRG_FR253 is a large 22-acre forested wetland located in the headwaters of the Furnace Run Watershed. Notable features include a headwater stream, a nice forested buffer zone and a smaller wetland (SumDRG_FR252) within its boundary. Wetland SumDRG_FR253 is in Richfield Township. Ownership complexity is relatively simple with 2 parcels and 2 property owners. Major property owner is the Akron Metropark District.

Wetland SumDRG_FR253 is most likely a high quality wetland. This is in consideration of the limited surrounding land uses and the high quality forested buffer. From 2000 to 2006 very little to no land use changes occurred. This wetland is also located in the riparian corridor. Additional studies may show that SumDRG_FR253 and SumDRG_FR252 are part of the same wetland system.

Next steps include a more detailed site assessment of this wetland. The site assessment should include completion of an ORAM and Penn State Stressor Checklist. This will help provide the location and extent of surrounding impacts, restoration potential and ultimately cost estimates. Preliminary cost estimates for this site are based on and extrapolated from previous wetland assessment projects. This site would be an easy mitigation project considering park ownership. A future enhancement project should include removing invasive plants and replanting with riparian/wetland species. A conservation easement should be placed on the back side of the residential parcel.

Cost Estimate

Item	Unit Cost	Unit	Cost
Detailed Sight Assessment	\$720	1	\$720
Plans & Specification	\$5,000	1	\$5,000
Remove Invasive Plants	\$220	0.8acres	\$176
Riparian / Wetland Plantings	\$8,000	0.8acres	\$6,400
Conservation Easement	??	5.93acres	??
TOTAL			\$12,296



Furnace Run Wetland Ranked #2 & #5: SumDRG_FR253 & 252 Scale: 1:5,000

Map Key

- Yellow Lines -Wetland boundary
- Yellow Points -Centroid point calculated from wetland polygon
- Black Lines -Wetland 50m buffer
- Green Lines -Other wetlands
- Blue Lines -Streams
- Red Lines -Parcel boundary

- Base Layer -Ohio 2006 orthophotos
- Projection -Ohio State Plane North, NAD83

Ranked #3 & #7: WETLAND ID# SumDRG_FR250 & SumDRG_FR251	
Site Description	
Wetland Classification (<i>Hydrogeomorphic or Cowardin</i>)	Palustrine Emergent
Size (<i>acres</i>)	7.87
Wetland Buffer Condition	High Quality
Impacts (<i>Field Assessments</i>)	N/A
Restoration Potential	Remove Invasive Plants* Seeding/Wetland Plantings* Wetland Expansion
Ownership (<i>Public or Private</i>)	Public
Number of Parcels	1 Parcel / 1 Property Owner
Cost Estimates	\$35,255
Location (Lat/Long)	41.248532142487 / -81.627164744958
Community	Richfield Township

* Extrapolated Restoration Potential

Wetland SumDRG_FR250 is a fairly large 7-acre emergent wetland located on a headwater tributary to Furnace Run. Notable features include a headwater stream, a nice forested buffer zone and smaller surrounding wetlands such as SumDRG_FR251 and SumDRG_FR131. Wetland SumDRG_FR250 is in Richfield Township. Ownership complexity is simple with only 1 parcel and 1 property owner. The property owner is the Akron Metropark District.

Wetland SumDRG_FR250 is most likely a high quality wetland. This is in consideration of the limited surrounding land uses, the high quality forested buffer and a complex of surrounding wetlands. From 2000 to 2006 no land use changes occurred. This wetland is also located in the riparian corridor. Additional studies may show that SumDRG_FR251 and SumDRG_FR131 and some of the outlying wetlands are part of the same wetland system. Total wetland acreage is approximately 11 acres.

Next steps include a more detailed site assessment of this wetland. The site assessment should include completion of an ORAM and Penn State Stressor Checklist. This will help provide the location and extent of surrounding impacts, restoration potential and ultimately cost estimates. Preliminary cost estimates for this site are based on and extrapolated from previous wetland assessment projects. This site would be an easy mitigation project considering park ownership and should be made available for enhancements; including removal of invasive plants, reseeding and adding wetland species. Also, suitable hydric soils exist onsite to allow a wetland expansion to occur (expand 2 acres).

Cost Estimate

Item	Unit Cost	Unit	Cost
Detailed Sight Assessment	\$720	1	\$720
Plans & Specification	\$5,000	1	\$5,000
Mobilize Equipment	\$2,500		\$2,500
Remove Invasive Plants	\$220	1.1acres	\$242
Seeding / Wetland Plantings	\$5,000	3.1acres	\$15,500
Onsite Excavation	\$1.75/cy	6,453cy	\$11,293
TOTAL			\$35,255



Furnace Run Wetlands Ranked #3 & #7: SumDRG_FR250 & FR251

Scale: 1:5,000

Map Key

- Yellow Lines -Wetland boundary
- Yellow Points -Centroid point calculated from wetland polygon
- Black Lines -Wetland 50m buffer
- Green Lines -Other wetlands
- Blue Lines -Streams
- Red Lines -Parcel boundary

- Base Layer -Ohio 2006 orthophotos
- Projection -Ohio State Plane North, NAD83

Ranked #4: WETLAND ID# RAP9771	
Site Description	
Wetland Classification (<i>Hydrogeomorphic or Cowardin</i>)	Palustrine Forested, Emergent & Shrub/Scrub (PFO) (PEM) (PSS)
Size (<i>acres</i>)	32.53
Wetland Buffer Condition	Low Quality
Impacts (<i>Field Assessments</i>)	Adjacent Land Use Gas Line Through Wetland
Restoration Potential	Remove Invasive Plants Wetland Plantings
Ownership (<i>Public or Private</i>)	Private
Number of Parcels	6 Parcels / 6 Property Owners
Cost Estimates	\$120,746
Location (Lat/Long)	41.28415894 / -81.67056123
Communities	Broadview Heights, Brecksville

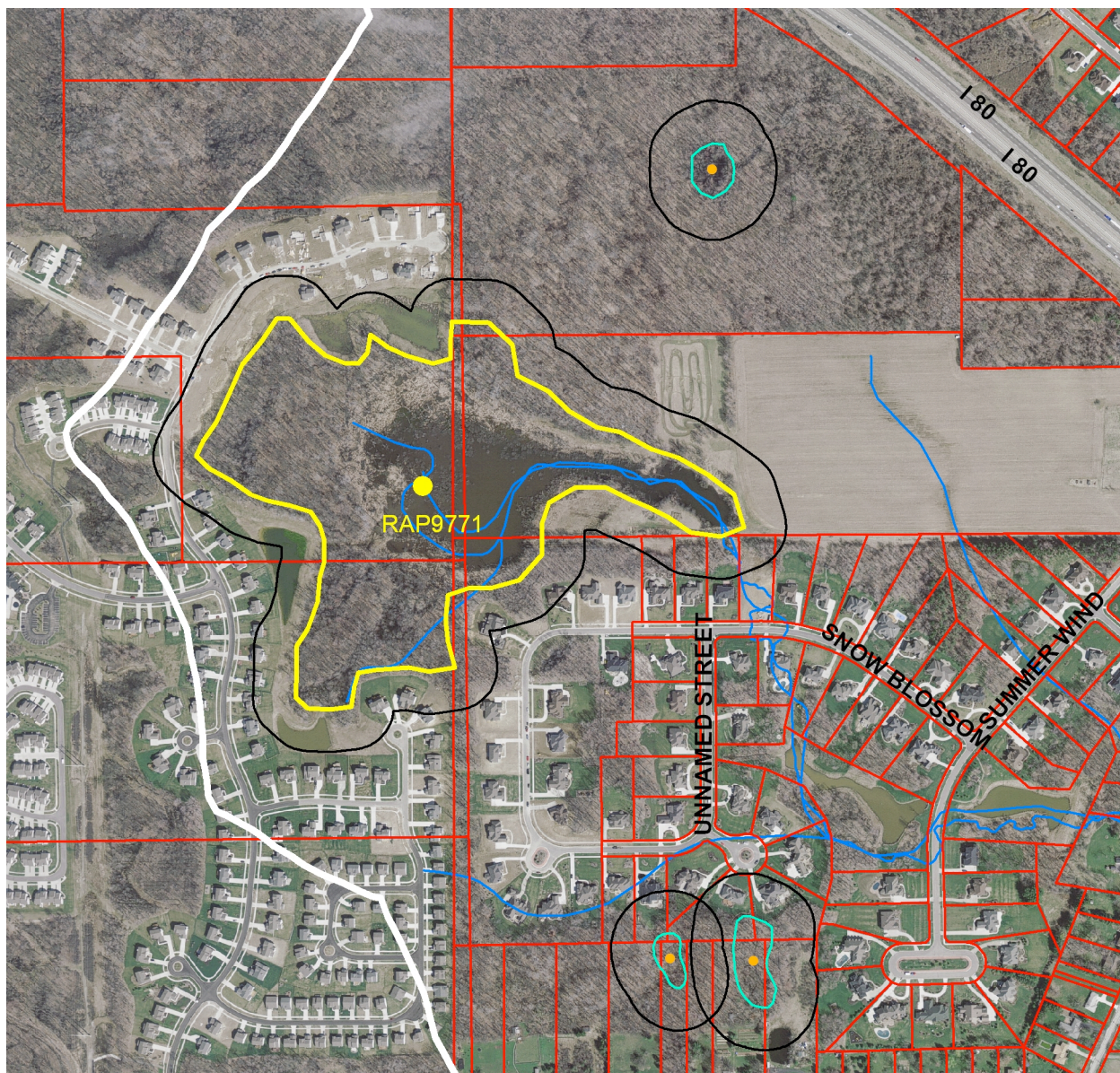
Wetland RAP9771 is a large 32-acre forested, emergent and shrub/scrub wetland located in the headwaters of the Furnace Run Watershed. Notable features include a connection with the headwater stream, open emergent water for wildlife habitat and presence of vernal pools. Wetland RAP9771 is located in the cities of Brecksville and Broadview Heights. Ownership complexity is moderate with 6 parcels and approximately 6 property owners.

Wetland RAP9771 is most likely a moderately low quality wetland. This is in consideration of the high intensity of surrounding land uses and the limited forest buffer surrounding the wetland. From 2000 to 2006 land use dramatically changed, with encroaching residential development approximately 36% of the wetland acreage was lost.

This site was field visited in 2003 by a RAP funded Project. Field notes indicated impacts from adjacent land use and substrate disturbance from a gas line. Also identified were invasive plant species, such as Reed Canary Grass, Common Reed and Glossy Buckthorn. A future enhancement project includes removing invasive plants and enhancing with riparian/wetland plantings. Pursue site acquisition by purchasing an easement on Parcel 585-20-002 which contains 48% of the site and consider purchasing Parcel 604-12-007, which contains 31% of the site.

Cost Estimate

Item	Unit Cost	Unit	Cost
Detailed Sight Assessment	\$720	1	\$720
Plans & Specification	\$5,000	1	\$5,000
Remove Invasive Plants	\$220	4.8acres	\$1,056
Seeding Wetland Plantings	\$5,000	4.8acres	\$24,000
Conservation Easement on Parcels	Market Land Value		\$\$\$
585-20-002 & 604-12-007		15acres	\$89,700
TOTAL			\$120,746



Furnace Run Wetland Ranked #4: RAP9771

Scale: 1:8,000

Map Key

- Yellow Lines -Wetland boundary
- Yellow Points -Centroid point calculated from wetland polygon
- Black Lines -Wetland 50m buffer
- Green Lines -Other wetlands
- Blue Lines -Streams
- Red Lines -Parcel boundary
- Purple Line -County boundary

- Base Layer -Ohio 2006 orthophotos
- Projection -Ohio State Plane North, NAD83

Ranked #6: WETLAND ID# SumDRG_FR40	
Site Description	
Wetland Classification (<i>Hydrogeomorphic or Corwardin</i>)	Palustrine Forested (PFO)
Size (<i>acres</i>)	7.35
Wetland Buffer Condition	Moderate Quality
Impacts (<i>Field Assessments</i>)	N/A
Restoration Potential	Remove Invasive Plants* Riparian/Wetland Plantings*
Ownership (<i>Public or Private</i>)	Private
Number of Parcels	5 Parcels / 5 Property Owners
Cost Estimates	\$14,762
Location (Lat/Long)	41.27114251 / -81.61928802
Community	Richfield Township

* Extrapolated Restoration Potential

Wetland FR40 is a large 7-acre forested wetland located in the headwaters of the Furnace Run Watershed. Notable features include the headwater stream, the location in the riparian corridor and nice forest cover over much of the site. Wetland FR40 is in Richfield Township. Ownership complexity is moderate with five parcels and five property owners.

Wetland FR40 is most likely a moderate to moderately low quality wetland. This is in consideration of the intensity of surrounding land use and the loss of forested buffer along the north and west border. From 2000 to 2006 development occurred along the northern border.

Next steps include a more detailed site assessment of this wetland. The site assessment should include an ORAM and Penn State Stressor Checklist completed. This will help provide the location and extent of surrounding impacts, restoration potential and ultimately cost estimates. Preliminary cost estimates for this site are based on and extrapolated from previous wetland assessment projects. A future enhancement project should include targeting invasive plant species and enhancing with riparian/wetland plantings. Site acquisition should include purchasing easements on the back end of the developed parcels and purchasing the undeveloped parcels. Undeveloped Parcel 480-15-62 contains 34% of the site and should be targeted first and purchased.

Cost Estimate

Item	Unit Cost	Unit	Cost
Detailed Sight Assessment	\$720	1	\$720
Plans & Specification	\$5,000	1	\$5,000
Remove Invasive Plants	\$220	1.1acres	\$242
Riparian / Wetland Plantings	\$8,000	1.1acres	\$8,800
Conservation Easement	??	4.8acres	??
Parcel 480-15-62	No Land Value Data		???
TOTAL			\$14,762



Furnace Run Wetland Ranked #6: SumDRG_FR40

Scale: 1:5,000

Map Key

- Yellow Lines -Wetland boundary
- Yellow Points -Centroid point calculated from wetland polygon
- Black Lines -Wetland 50m buffer
- Green Lines -Other wetlands
- Blue Lines -Streams
- Red Lines -Parcel boundary

- Base Layer -Ohio 2006 orthophotos
- Projection -Ohio State Plane North, NAD83

Ranked #8: WETLAND ID# SumDRG_FR27	
Site Description	
Wetland Classification (<i>Hydrogeomorphic or Cowardin</i>)	Palustrine Forested (PFO)
Size (<i>acres</i>)	8.81
Wetland Buffer Condition	High Quality
Impacts (<i>Field Assessments</i>)	N/A
Restoration Potential	Remove Invasive Plants* Riparian/Wetland Plantings*
Ownership (<i>Public or Private</i>)	Private
Number of Parcels	10 Parcels / 10 Property Owners
Cost Estimates	\$90,826
Location (Lat/Long)	41.25740457 / -81.61248323
Community	Richfield Township

* Extrapolated Restoration Potential

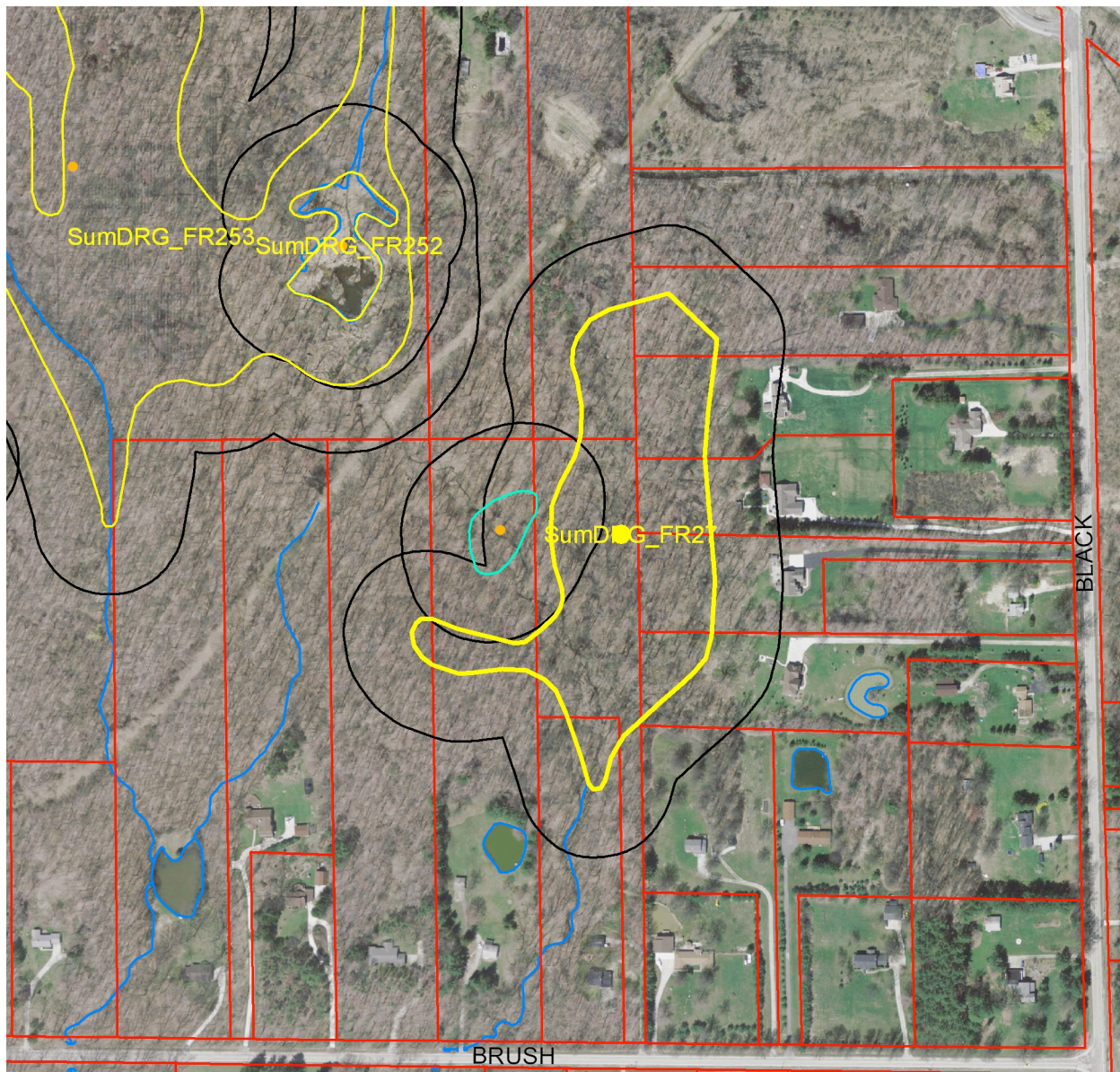
Wetland FR27 is an 8-acre forested wetland located in the headwaters of the Furnace Run Watershed. Notable features include a headwater stream, the location in the riparian corridor, nice forested buffer zone and the nearby wetlands FR252 and FR253. Wetland FR27 is in Richfield Township. Ownership complexity is relatively high with 10 parcels and 10 property owners.

Wetland FR27 is most likely a moderate to moderately high quality wetland. This is in consideration of the relatively rural nature of the watershed, low intensity of surrounding land use and a high quality forested buffer. From 2000 to 2006 there were no visible changes in the nearby land use.

Next steps include a more detailed site assessment of this wetland. The site assessment should include an ORAM and Penn State Stressor Checklist completed. This will help provide the location and extent of surrounding impacts, restoration potential and ultimately cost estimates. Preliminary cost estimates for this site are based on and extrapolated from previous wetland assessment projects. A future enhancement project should include targeting invasive plant species and enhancing with riparian/wetland plantings. Site acquisition should include purchasing easements on the back end of the developed parcels and purchasing the undeveloped parcels. Undeveloped Parcel 480-02-98 contains 36% of the site and should be targeted first and purchased.

Cost Estimate

Item	Unit Cost	Unit	Cost
Detailed Sight Assessment	\$720	1	\$720
Plans & Specification	\$5,000	1	\$5,000
Remove Invasive Plants	\$220	1.3acres	\$286
Riparian/Wetland Plantings	\$8,000	1.3acres	\$10,400
Parcel 480-02-98	Market Land Value		\$74,420
Conservation Easement	???	5.7acres	???
TOTAL			\$90,826



Furnace Run Wetland Ranked #8: SumDRG_FR27

Scale: 1:5,000

Map Key

- Yellow Lines -Wetland boundary
- Yellow Points -Centroid point calculated from wetland polygon
- Black Lines -Wetland 50m buffer
- Green Lines -Other wetlands
- Blue Lines -Streams
- Red Lines -Parcel boundary
- Purple Line -County boundary

- Base Layer -Ohio 2006 orthophotos
- Projection -Ohio State Plane North, NAD83

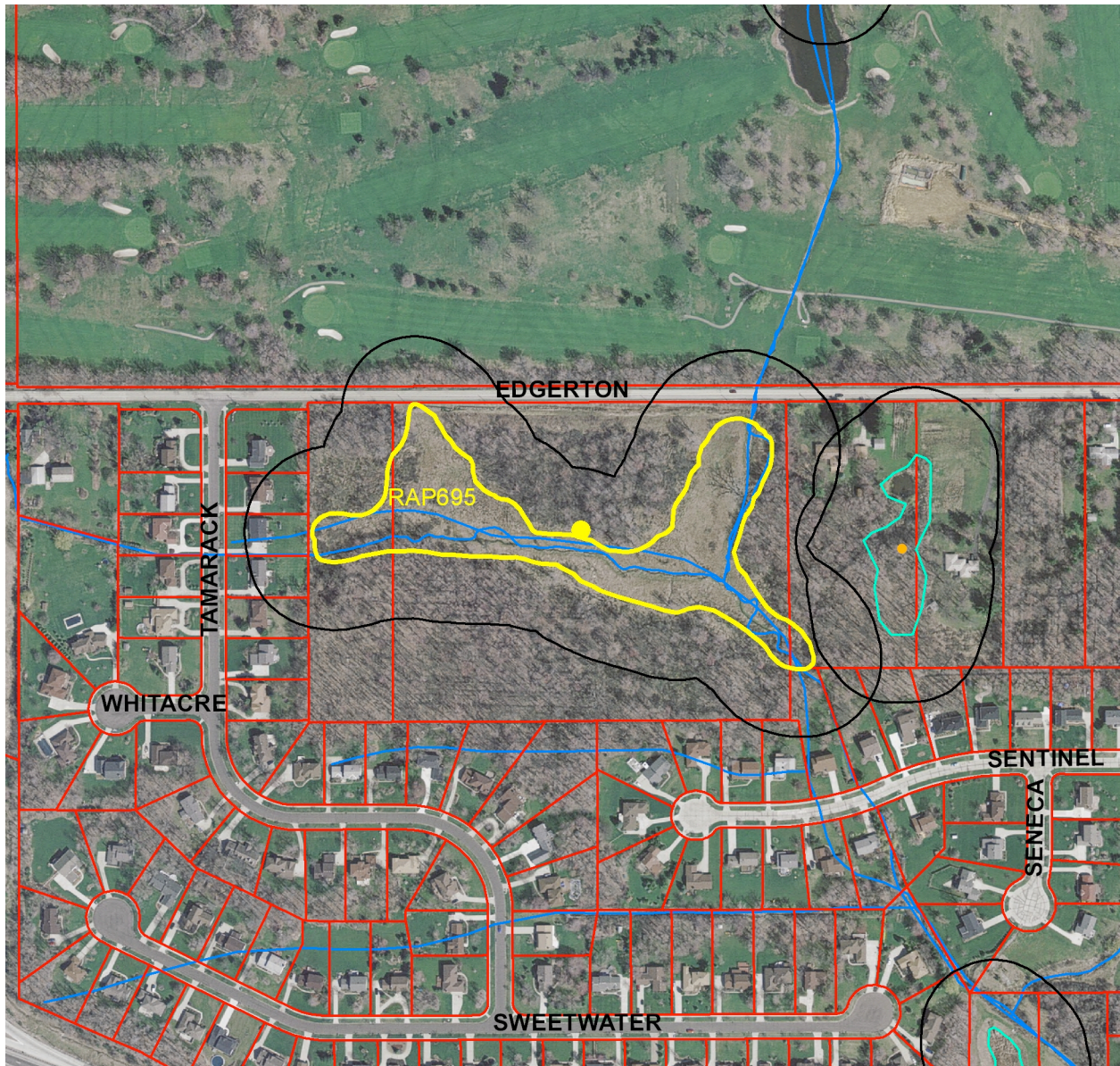
Ranked #9: Wetland ID# RAP695	
Site Description	
Wetland Classification (<i>Hydrogeomorphic or Corwardin</i>)	Paulustrine Emergent (PEM) Palustrine Forested (PFO)
Size (<i>acres</i>)	5.4
Wetland Buffer Condition	High Quality
Impacts (<i>Field Assessments</i>)	New Fill; Drainage Ditch
Restoration Potential	Remove Invasive Species; Remove Fill; Restore Hydrology
Ownership (<i>Public or Private</i>)	Private
Number of Parcels	3 Parcels / 3 Property Owners
Cost Estimates	(not determined)
Location (Lat/Long)	41.29464753 / -81.66506200
Community	Brecksville

Wetland RAP695 is a 5.4-acre emergent and forested wetland located in the upper reaches of the Furnace Run Watershed. Notable features include the west branch of Furnace Run, (flowing north to south), a tributary stream (flowing west to east), location within the riparian corridor, and a primarily forested buffer zone. Wetland RAP695 is in the City of Brecksville. Ownership complexity is low with 3 parcels and 3 property owners.

Wetland RAP695 is most likely a moderate quality wetland, due to the amount of forest in the buffer, surrounding residential land use and streams that flow through a golf course and residential area before entering the site. From 2002 to 2006 there were no visible changes in the nearby land use.

Next steps include a more detailed site assessment of this wetland. The site assessment should include the completion of an ORAM and Penn State Stressor Checklist. This will help provide the location and extent of surrounding impacts, restoration potential and ultimately cost estimates. Preliminary cost estimates for this site have not been calculated. A future project should include removing invasive plant species and enhancing with riparian/wetland plantings. Site protection should include purchasing parcel #604-02-001, which contains 88% of the wetland, and a conservation easement for the other 2 parcels.

Cost estimates are not yet available for this site.



Furnace Run Wetland Ranked #9: RAP695

Scale: 1:3,000

Map Key

- Yellow Lines -Wetland boundary
- Yellow Points -Centroid point calculated from wetland polygon
- Black Lines -Wetland 50m buffer
- Green Lines -Other wetlands
- Blue Lines -Streams
- Red Lines -Parcel boundary
- Purple Line -County boundary

- Base Layer -Ohio 2006 orthophotos
- Projection -Ohio State Plane North, NAD83

Ranked #10: WETLAND ID# RAP437	
Site Description	
Wetland Classification (<i>Hydrogeomorphic or Cowardin</i>)	Palustrine Shrub/Scrub (PSS)
Size (<i>acres</i>)	3.65
Wetland Buffer Condition	High Quality
Impacts (<i>Field Assessments</i>)	N/A
Restoration Potential	Remove Invasive Plants* Riparian/Wetland Plantings*
Ownership (<i>Public or Private</i>)	Public
Number of Parcels	2 Parcels / 2 Property Owners
Cost Estimates	\$9,830
Location (Lat/Long)	41.3023281 / -81.66386142
Community	Brecksville

* Extrapolated Restoration Potential

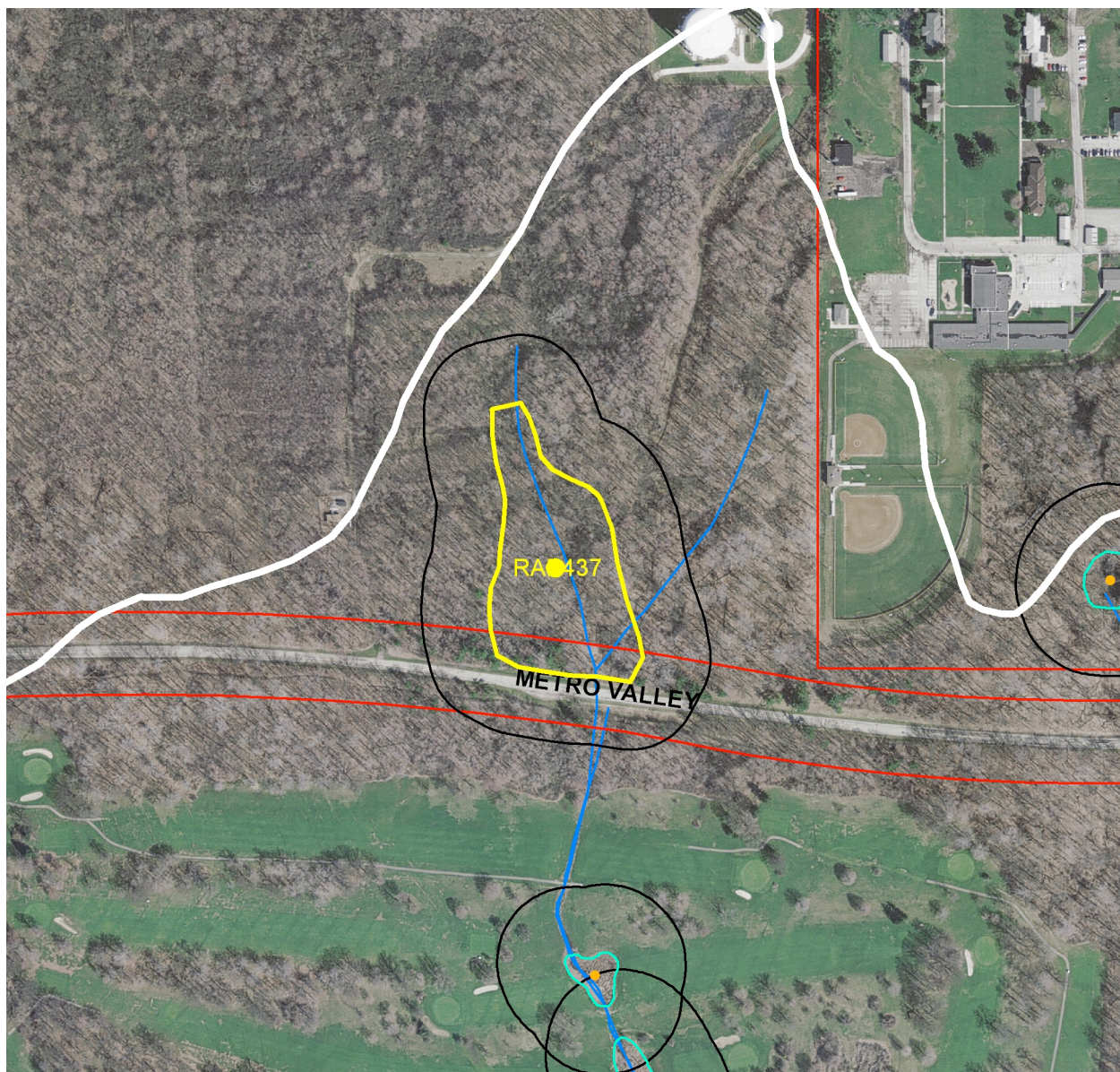
Wetland RAP437 is a 3-acre shrub/scrub wetland located in the headwaters of the Furnace Run Watershed. Notable features include a headwater stream, the location in the riparian corridor, a nice forested buffer zone and this wetland is partly owned by the Cleveland Metroparks. Wetland RAP437 is in the city of Brecksville. Ownership complexity is easy with 2 parcels and 2 public property owners, the city of Brecksville (83%) and Cleveland Metroparks (13%).

Wetland RAP437 is most likely a moderate to moderately high quality wetland. This is in consideration of the relatively rural nature of the watershed, low intensity of surrounding land use and a high quality forested buffer. From 2000 to 2006 two baseball diamonds were built to east of this wetland, but those land use changes were outside the buffer zone.

Next steps include a more detailed site assessment of this wetland. The site assessment should include an ORAM and Penn State Stressor Checklist completed. This will help provide the location and extent of surrounding impacts, restoration potential and ultimately cost estimates. Preliminary cost estimates for this site are based on and extrapolated from previous wetland assessment projects. Considering the public ownership this site would be relatively easy to direct mitigation opportunities. A future enhancement project should include targeting invasive plant species and enhancing with riparian/wetland plantings. Establishing an easement on site for permanent protection should be pursued. Discussions should begin with the city of Brecksville who owns 83% of the wetland site.

Cost Estimate

Item	Unit Cost	Unit	Cost
Detailed Sight Assessment	\$720	1	\$720
Plans & Specification	\$5,000	1	\$5,000
Remove Invasive Plants	\$220	0.5acres	\$110
Riparian / Wetland Plantings	\$8,000	0.5acres	\$4,000
Conservation Easements	??	3.65acres	??
TOTAL			\$9,830



Furnace Run Wetland Ranked #10: RAP437

Scale: 1:5,000

Map Key

- Yellow Lines -Wetland boundary
- Yellow Points -Centroid point calculated from wetland polygon
- Black Lines -Wetland 50m buffer
- Green Lines -Other wetlands
- Blue Lines -Streams
- Red Lines -Parcel boundary

- Base Layer -Ohio 2006 orthophotos
- Projection -Ohio State Plane North, NAD83

Ranked #11: WETLAND ID# SumDRG_FR90	
Site Description	
Wetland Classification (<i>Hydrogeomorphic or Corwardin</i>)	Palustrine Shrub/Scrub (PSS)
Size (<i>acres</i>)	1.34
Wetland Buffer Condition	High Quality
Impacts (<i>Field Assessments</i>)	N/A
Restoration Potential	Remove Invasive Plants* Riparian/Wetland Plantings* Wetland Expansion
Ownership (<i>Public or Private</i>)	Public
Number of Parcels	1 Parcel / 1 Property Owner
Cost Estimates	\$76,452
Location (Lat/Long)	41.25792337 / -81.63545387
Community	Richfield

* Extrapolated Restoration Potential

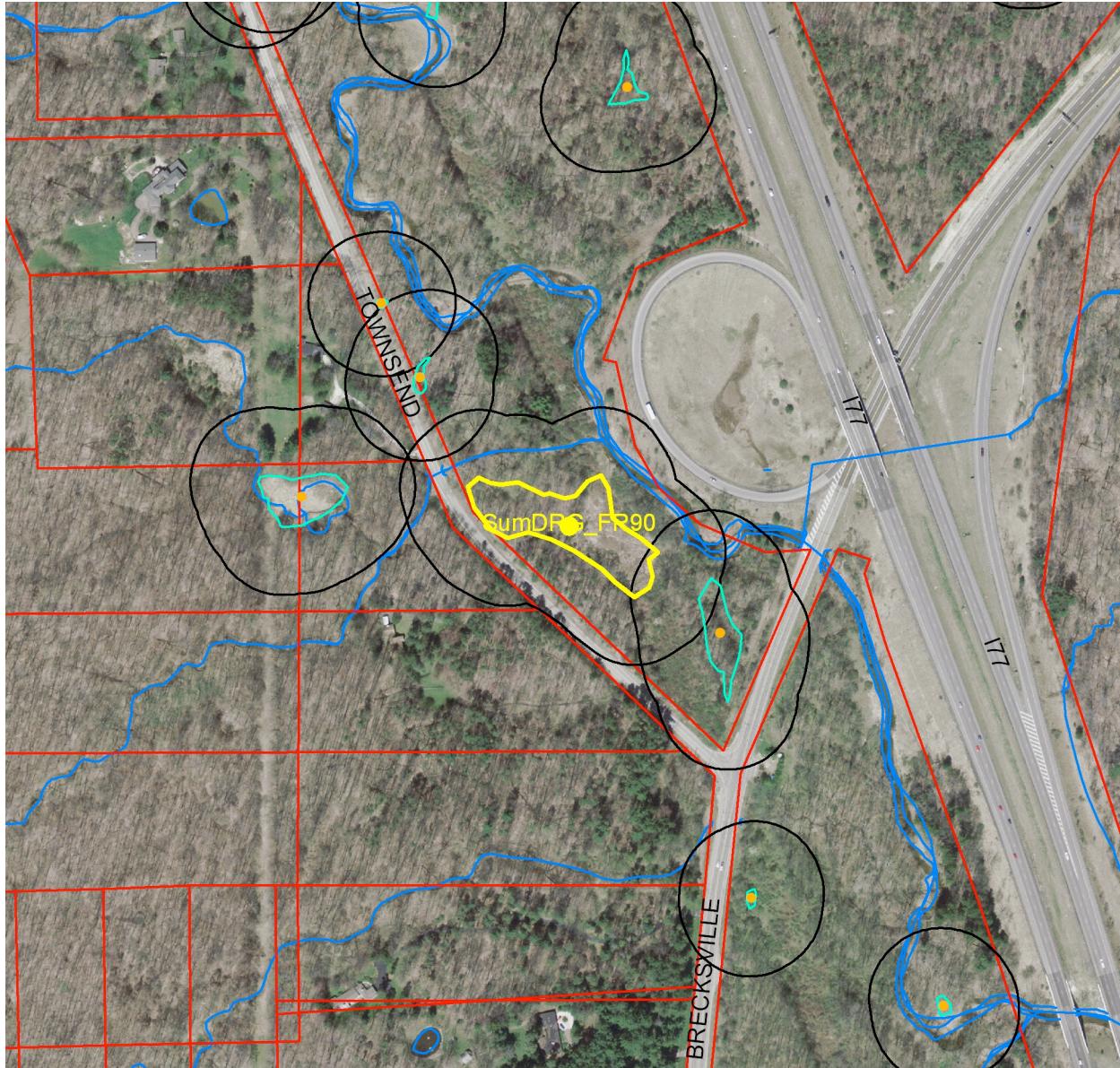
Wetland FR90 is a 1-acre shrub/scrub wetland located on the mainstem of Furnace Run. Notable features include Furnace Run mainstem and a tributary, several nearby wetland sites, its location in the riparian corridor and this site is part of the Akron Metropark District. Wetland FR90 is located in the Village of Richfield. Ownership complexity is easy with 1 parcel and 1 public owner. Summit Metroparks is the landowner.

Wetland FR90 is most likely a moderate quality wetland. This is in consideration of the surrounding land use such as I-77, Brecksville and Townsend Roads and a high quality forested buffer. From 2000 to 2006 relatively little, if any, nearby land use changes occurred.

Next steps include a more detailed site assessment of this wetland. The site assessment should include an ORAM and Penn State Stressor Checklist completed. This will help provide the location and extent of surrounding impacts, restoration potential and ultimately cost estimates. Preliminary cost estimates for this site are based on and extrapolated from previous wetland assessment projects. This site would be easy to direct mitigation opportunities and discussions should begin with the Metroparks. A future enhancement project should include targeting invasive plant species, enhancing with riparian/wetland plantings. Also, this site contains suitable hydric soils which would allow a wetland expansion project to occur (expand 5 acres).

Cost Estimate

Item	Unit Cost	Unit	Cost
Detailed Sight Assessment	\$720	1	\$720
Plans & Specification	\$5,000	1	\$5,000
Mobilizing Equipment	\$2,500	1	\$2,500
Onsite Excavation	\$1.75/cy	16,133cy	\$28,232
Riparian / Wetland Plantings	\$8,000	5acres	<u>\$40,000</u>
TOTAL			\$76,452



Furnace Run Wetland Ranked #11: SumDRG_FR90

Scale: 1:5,000

Map Key

- Yellow Lines -Wetland boundary
- Yellow Points -Centroid point calculated from wetland polygon
- Black Lines -Wetland 50m buffer
- Green Lines -Other wetlands
- Blue Lines -Streams
- Red Lines -Parcel boundary

- Base Layer -Ohio 2006 orthophotos
- Projection -Ohio State Plane North, NAD83

Ranked #12: WETLAND ID# RAP698	
Site Description	
Wetland Classification (<i>Hydrogeomorphic or Corwardin</i>)	Palustrine Forested & Emergent (PFO) (PEM)
Size (<i>acres</i>)	1.97
Wetland Buffer Condition	High Quality
Impacts (<i>Field Assessments</i>)	None
Restoration Potential	Remove Invasive Plants Riparian/Wetland Planting
Ownership (<i>Public or Private</i>)	Private
Number of Parcels	6 Parcels / 6 Property Owners
Cost Estimates	\$74,064
Location (Lat/Long)	41.28344557 / -81.64861686
Community	Brecksville

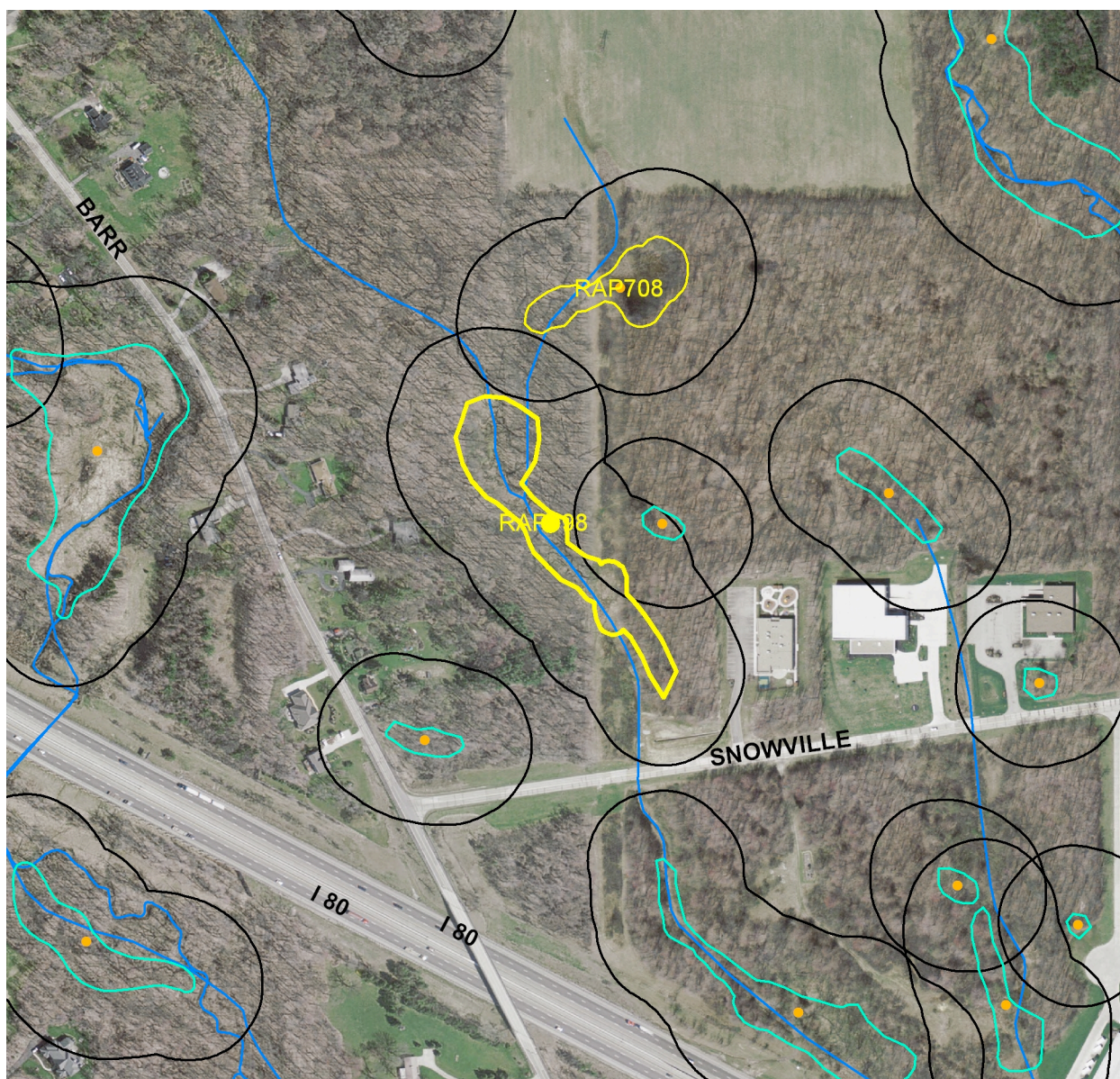
Wetland RAP698 is a 1.97-acre forested and emergent wetland located near the headwaters of Furnace Run. Notable features include two headwater streams, its location in the riparian corridor, several nearby wetlands including RAP708 and a well forested buffer zone. Wetland RAP698 is located in the City of Brecksville. Ownership complexity is relatively moderate with six parcels and six private landowners.

Wetland RAP698 is most likely a moderate to moderately high quality wetland. This is in consideration of the relatively rural nature of the watershed, low intensity of surrounding land use, high quality forested buffer and limited land use impacts noted during a field visit.

Wetland RAP698 was field varied in 2003 by a RAP funded project. Field notes indicate nearby power lines impacted the site. Noted plant species were Green Ash and Common Rush. Invasive plant species were a small problem with Buckthorn identified in small quantities. A future conservation project should include purchasing parcel 604-23-001 which contains 41% and purchasing conservation easement around parcel 604-14-002 which contains 39% of the site. Discussions should begin with these two property owners.

Cost Estimate

Item	Unit Cost	Unit	Cost
Plans & Specification	\$5,000	1	\$5,000
Remove Invasive Plants	\$220	.29acres	\$64
Riparian / Wetland Plantings	\$8,000	.29acres	\$2,320
Parcel 604-15-001	Market Land Value		\$66,680
Conservation Easement	??	0.7acres	???
TOTAL			\$74,064



Furnace Run Wetland Ranked #12: RAP698

Scale: 1:5,000

Map Key

- Yellow Lines -Wetland boundary
- Yellow Points -Centroid point calculated from wetland polygon
- Black Lines -Wetland 50m buffer
- Green Lines -Other wetlands
- Blue Lines -Streams
- Red Lines -Parcel boundary

- Base Layer -Ohio 2006 orthophotos
- Projection -Ohio State Plane North, NAD83

Ranked #13: WETLAND ID# ORAM2343	
Site Description	
Wetland Classification (<i>Hydrogeomorphic or Corwardin</i>)	Slope Headwater
Size (<i>acres</i>)	1.71
ORAM Score	Category 2
Wetland Buffer Condition	High Quality
Impacts (<i>Field Assessments</i>)	No Impacts
Restoration Potential	Remove Invasive Plants; Riparian/Wetland Planting Wetland Expansion; Stream Restoration
Ownership (<i>Public or Private</i>)	Private
Number of Parcels	3 Parcels / 3 Property Owners
Cost Estimates	\$235,368
Location (Lat/Long)	41.23143055 / -81.58501283
Community	Boston Township

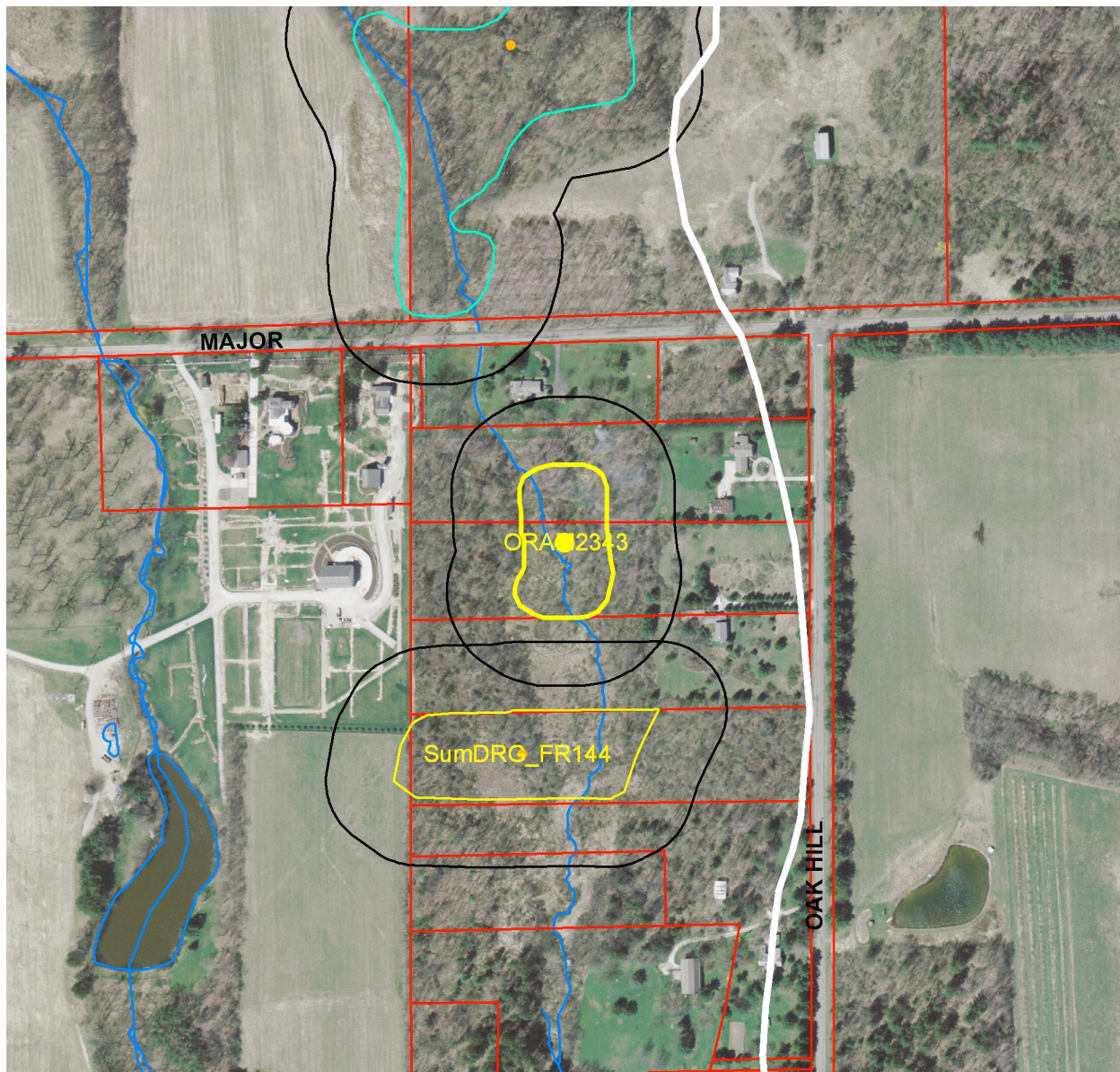
Wetland ORAM2343 is a 1.71-acre headwater wetland located on a tributary in the upper reaches of the Furnace Run Watershed. Notable features include the headwater stream, its location in the riparian corridor and neighboring wetlands up and downstream of this site. Wetland ORAM2343 is located in Boston Township. Ownership complexity is relatively simple with 3 parcels and 3 property owners.

Wetland ORAM2343 is a moderate quality Category 2 wetland. This natural resource provides good connectivity to the stream and other wetlands for water storage and habitat benefits. Minimal land use changes have occurred from 2000 to 2006. The surrounding wetland buffer is fairly high quality with small portions of residential development encroaching into the buffer zone. No hydrologic impacts were identified on site. Habitat was rated “good” with no impacts and small amounts of coarse woody debris. The habitat is a mix of emergent, shrub/scrub and forest cover. Field notes indicate approx 50% coverage of invasive plant species.

This wetland was field verified during a 2005 RAP funded Project. A future enhancement project should include targeting invasive plants, enhancing with riparian/wetland plantings. Suitable hydric soils exist to allow a wetland expansion to occur (expand 3 acres) and connect with Wetland SumDRG_FR144. A stream enhancement project could also be accomplished simultaneously. The wetland site should be acquired by purchasing a conservation easement on the three parcels.

Cost Estimate

Item	Unit Cost	Unit	Cost
Plans & Specification	\$5,000	1	\$5,000
Mobilizing Equipment	\$2,500		\$2,500
Remove Invasive Plants	\$660	0.8	\$528
Riparian / Wetland Plantings	\$8,000	3.8acres	\$30,400
Wetland Expansion	\$1.75/CY	9,680CY	\$16,940
Stream Restoration	\$300/LF	600LF	\$180,000
Conservation Easement	\$???	??acres	\$???
TOTAL			\$235,368



Furnace Run Wetland Ranked #13: ORAM2343
 (FRW Ranked #17: SumDRG_FR144)

Scale: 1:5,000

Map Key

- Yellow Lines -Wetland boundary
- Yellow Points -Centroid point calculated from wetland polygon
- Black Lines -Wetland 50m buffer
- Green Lines -Other wetlands
- Blue Lines -Streams
- Red Lines -Parcel boundary

- Base Layer -Ohio 2006 orthophotos
- Projection -Ohio State Plane North, NAD83

• This page left blank •

Appendix C

Balanced Growth Program

Fact Sheets & Incentives



Ohio Balanced Growth Program

Fact Sheet: Program Overview

Balanced Growth is a voluntary, incentive based strategy to protect and restore Lake Erie, the Ohio River, and Ohio's watersheds to assure long-term economic competitiveness, ecological health, and quality of life. The recommendations focus on reducing urban sprawl, protecting natural resources and encouraging redevelopment in urban areas.

Adopted statewide in 2009, the Ohio Balanced Growth Program recommendations include:

- A regional focus on land use and development planning.
- The creation of local Watershed Planning Partnerships to designate, Priority Conservation Areas and Priority Development Areas (and Priority Agricultural Areas, if desired).
- The alignment of state policies, incentives, funding, and other resources to support watershed balanced growth planning and implementation.
- The implementation of recommended model regulations to help promote best local land use practices that minimize impacts on water quality and provide for well planned development efficiently served by infrastructure.

Implementing the Recommendations

- Initially, four pilot watersheds developed Watershed Balanced Growth Plans, which are a regional framework for coordinated, local decision making about how growth and conservation should be promoted by local and state policies and investments.
- An *Ohio Balanced Growth Strategy* identifies programs and policies that state agencies can use to assist and encourage local governments in implementing the Watershed Balanced Growth Plans.
- The state sponsors an awareness and training program on Best Local Land Use Practices highlighting the model regulations and local guidance.

This program will help move Ohio in a new direction in its thinking about growth and development. It will raise the stewardship of our watersheds to a higher level; promote new forms of regional cooperation; and help everyone in the state envision how restoration of natural resources will be an essential part of Ohio's future progress.

Ohio Balanced Growth Program

Fact Sheet: Best Local Land Use Practices

The Best Local Land Use Practices document prepared for the Balanced Growth Program contains three model regulations and eleven guidance documents that can be used by local governments to guide the location of development and improve its design. The document also contains recommendations to consider as local governments prepare comprehensive plans.

These model regulations have been thoroughly researched, drawing from actual practices in Ohio and other states. They constitute some of the very best land-use practices available for protecting and restoring sensitive areas and contributing to economic growth.

These model regulations are intended as guides. To be effective, new regulations must only be adopted after consideration and modification to reflect specific local conditions and after a careful review by the local government's legal advisor and others prior to adoption and use. This ensures that they will suit the individual needs of the community.

The model regulations include:

Stormwater Management

This model includes stormwater management, erosion and sediment control, and protection of riparian areas, floodplains, and wetlands. Local measures to reduce stormwater impacts and protect aquatic areas can show a direct savings of community dollars from managing stormwater and floods.

Meadow Protection

This model can be used in communities where mowing regulations exist. It is intended to ensure that natural meadow areas are permitted and protected. These areas are not necessarily unkempt; they actually serve important natural functions to reduce runoff, improve its quality, and provide habitat.

A coastal protection ordinance has been planned for, but has not yet been developed.

The eleven Guidance Documents in Best Local Land Use Practices contain recommended best practices and links to regulations that have been successfully used by other communities. The subject areas included in this are:

Conservation Development allows for homes normally permitted on a parcel to be grouped together on smaller lots, while a sizeable proportion of the property is set aside as common open space.

Ohio Balanced Growth Program

Fact Sheet: Best Local Land Use Practices

Compact Development plans help conserve open space and natural resources while enhancing a particular development.

Source Water Protection addresses what local governments can do to protect their drinking water from point and nonpoint source pollution.

Agricultural Land Protection focuses on strategies that local governments can take to conserve valuable farm land, while protecting surface and groundwater resources.

Woodland Protection deals with practices that communities can use to conserve woodlots critical for environmental quality and community character.

Scenic Protection of views and other open space can increase recreational opportunities and improve economic growth.

Historic Preservation can increase property values as much as 20% and often lead to reinvestment in the community.

Protection of Steep Slopes from development can reduce uncontrolled stormwater flows, dangerous erosion, and flooding.

Transfer of Development Rights would allow rural landowners to maintain their properties, redirecting growth to more compact development areas, possibly in more urbanized areas.

Brownfields Redevelopment addresses strategies that would encourage the cleanup and reuse of brownfield sites, and polluted areas of land.

Access Management regulations give local government a means for minimizing traffic congestion and travel delay while enhancing safety.

The Best Local Land Use Practices document is available on the Balanced Growth Program website.

Ohio Balanced Growth Program

Fact Sheet: Frequently Asked Questions

Why did the Balanced Growth Task Force propose this program?

- Habitat protection and water quality improvement in Ohio's rivers and streams are directly tied to the location of development and how we use the land.
- We need solutions that are unique to Ohio and respect our traditions – the Balanced Growth Program does just that.

What is Balanced Growth?

- Balanced Growth is a strategy to protect and restore Ohio's watersheds to assure long-term economic competitiveness, ecological health, and quality of life.
- Defining areas where we want to support development and those areas where we want to support conservation will help us achieve these goals.

What happens to land if it is in a Priority Conservation Area (PCA)?

- A Priority Conservation Area consists of locally designated areas for protection and restoration. They may be critically important as ecological, recreational, heritage, agricultural, and public access areas that are significant for their contribution to Lake Erie water quality and general quality of life. Agricultural areas may be designated as Priority Agricultural Areas if a planning partnership so chooses.
- There is no change in the owner's property rights.
- Property is still subject to local land-use regulation.
- State public policy decisions would recognize the property as a conservation area, and the state would not encourage or provide funding for development of the area.

What happens to land if it is in a Priority Development Area (PDA)?

- A Priority Development Area consists of locally designated areas where growth and/or redevelopment is to be especially encouraged to maximize development potential, increase the efficient use of infrastructure, promote the revitalization of existing cities and towns, and contribute to the restoration of Ohio's waters.
- The land may be eligible for state policy and funding incentives to support and encourage its use as a desirable area for development.
- A PDA is not like an urban growth boundary because development can occur outside of the PDA; such development, however, would not be encouraged through state investments.

Who designates PCAs and PDAs?

- The designations will be made by Watershed Planning Partnerships, which are local entities that can be organized in flexible ways to respond to local conditions, existing planning structures, and available resources. The partnerships can be composed of representatives of local governments, planning agencies, councils of

Ohio Balanced Growth Program

Fact Sheet: Frequently Asked Questions

government, special purpose authorities (such as metropolitan planning organizations, sewer districts, or transit authorities), or non-governmental organizations (such as watershed organizations, chambers of commerce, or land trusts).

Who can participate in the development of Watershed Balanced Growth Plans?

- All stakeholders in the community. Watershed Planning Partnership work must be open, inclusive, and focused on consensus-building.
- Public education and involvement will be important parts of the process.

Don't we already have programs to deal with problems such as flooding, erosion and water quality?

- Yes, but they deal with correcting past problems. Balanced Growth is intended to prevent future problems by encouraging local governments to plan for the location of development and to plan for land areas that should be conserved.

Why is it important to do planning by watersheds?

- A watershed is an area of land from which surface water drains into a common outlet such as a river or lake.
- Watersheds are naturally functioning units that drain entire areas.
- Significant watershed planning is already occurring in Ohio.

How does the Balanced Growth Program relate to other watershed efforts?

- This proposal builds on existing watershed organizations where trust and understanding are being developed.
- Balanced Growth is the missing piece in many current watershed planning efforts.

Why not just let local governments take care of this problem?

- Local officials recognize that some of their most pressing issues (i.e. economic development, housing supply, transportation, environmental quality) often have a larger regional dimension. When local governments each plan independently, they are impacted by and are impacting similar regional issues. By transcending political fragmentation and collaborating at a larger geographic scale, more effective local solutions can be realized.
- State programs and actions influence where development will occur.
- Balanced Growth allows and encourages local governments working together to guide the state's influence.
- Balanced Growth encourages everyone to think about planning on a larger scale.

Will this program create unfunded mandates for local governments?

- No. While local governments will be asked to attend meetings and participate in the planning – the program is both voluntary and locally driven and will only occur where local governments decide to participate.

Ohio Balanced Growth Program

Fact Sheet: Frequently Asked Questions

- Balanced Growth provides incentives—both technical and financial help—to develop the plans.
- Balanced Growth enhances existing watershed planning efforts, and should make all planning for development and conservation more effective and efficient.
- Balanced Growth is not regulatory, but should provide more effective tools to make better land-use decisions.

Will this program pre-empt local land use practices?

- No. Voluntary, locally driven processes will provide direction to state programs and support local planning.

How will this save tax dollars?

- State financial incentives would support the priority areas that offer efficient use of tax dollars for public works and the infrastructure to support development.
- It would reduce redundant expenditures for infrastructure and encourage redevelopment in areas where infrastructure investment already exists.

Why would local developers and builders support this effort?

- Predictability is provided for areas where development should occur and also where development is going to run into physical and regulatory hurdles.
- Uniformity is provided as local governments in the watershed begin to adopt a similar approach to plan and manage development.

Will the Balanced Growth Program take private property?

- No. There are no regulatory changes as a result of the designation of PCAs and PDAs.

How will the Balanced Growth Program help redevelop cities?

- Areas with existing infrastructure may be locally designated as Priority Development Areas, and development or redevelopment would be encouraged through state incentives.

What will happen to farmland under this program?

- Predictability is provided by local expectations for development areas.
- Support will be provided for local efforts and plans to conserve farmland.
- Watershed Planning Partnerships may, at their discretion, establish Priority Agricultural Areas to facilitate agricultural protection.

Ohio Balanced Growth Program

Fact Sheet: Incentives

What is the fundamental principle to guide state agencies under the Balanced Growth Program?

If local governments can agree on areas within a watershed where development is to be encouraged (PDAs) and areas where conservation activities are to be promoted (PCAs), the State of Ohio will support those decisions by aligning state programs to support those decisions, and conversely will not utilize state programs to violate those locally based decisions.

What are the objectives of the state incentives package?

- Promote economically and environmentally sound watershed-based planning by local governments
- Provide incentives for development in PDAs
- Promote redevelopment in PDAs
- Provide incentives to promote conservation activities in PCAs (including agricultural protection in PAAs)

What is included in the state incentive package for local governments?

- Opportunity to work with state agencies through the **State Assistance Work Group** – this group is charged with assisting the participating local governments in identifying and obtaining technical and financial resources that can be used to support PCAs and PDAs.
- **Streamlining and Predictability** – the State Assistance Work Group will develop methods to provide more advance predictability and streamlining for site related decisions in PCAs and PDAs.
- **State Program Inventory** – a list of all state programs and funding sources that could be used to support conservation in the PCAs and development or redevelopment in the PDAs.
- **Financial and Technical Special Incentives** – The special incentives are a subset of the state programs inventory and include specific grant and technical assistance programs that offer added consideration for projects that are within PCAs and PDAs within participating local government jurisdictions. A list of these special incentives is provided in the Ohio Balanced Growth Strategy.

Ohio Balanced Growth Program

Fact Sheet: Indicators

An indicator is something that helps you understand where you are, which way you are going, and how far you are from where you want to be. Indicators are like pieces of evidence, or clues that tell us about the condition of something of interest.

Environmental indicators provide useful information to assess the condition of and, when tracked over time, trends occurring in our surroundings. Performance measures are the metrics used to monitor and report the progress and accomplishments of specific programs or projects, and can be used to gauge program or project performance. All indicators must be measurable so that changes can be compared over time and/or to an end point or a reference point.

The Balanced Growth Task Force recommended the development of three types of indicators to measure success of the program in guiding land development and conservation. Participants at a roundtable workshop held in January 2005 selected a suite of indicators to fit each category. These indicators will be used to measure Balanced Growth success as the program is implemented across Ohio.

Programmatic Indicators- tracking whether the initiative is being implemented and whether it is changing policies at the state and local levels.

- Change in Public Economic Development Investment in PDAs
- Change in Public Conservation Investment in PCAs
- Change in Number of Watershed that have a Balanced Growth Watershed Planning Partnership
- Change in Number of Endorsed Watershed Balanced Growth Plans
- Change in Number of Local Comprehensive Land Use Plans in Watershed that Identify PCAs and PDAs to Guide Local Land Use Decisions
- Change in Number of PCAs and PDAs
- Change in Number of Local Governments/Communities Adopting Best Practices

Land Use and Socioeconomic Indicators- tracking whether the policy changes are changing patterns of land use.

- Change in Impervious Surface Cover
- Change in Residential and Other Development Intensity in PDAs vs. Outside PDAs
- Change in Percentage of New Commercial and Industrial Building Floor Area and New Housing Units Going Into PDAs vs. Rest of the Watershed
- Change in Number of Acres of Land in Conservation/Protected Status in PCAs

Natural Resource Indicators- tracking whether the land use changes actually produce improvements in watershed health.

- Change in Water Chemistry
- Change Biotic Quality



Balanced Growth

balancedgrowth.ohio.gov

Ohio Balanced Growth Program

Fact Sheet: Local Government Roles

Who are the local governments?

In the context of Watershed Planning Partnerships, “local governments” include; townships, villages, cities, counties, special districts, planning commissions, and regional councils.

Planning Role

- A local government organization may become the lead agency in organizing a Watershed Planning Partnership.
- Local governments are encouraged to participate in the watershed planning process.
- Identify development and conservation areas that they want to bring forth in the planning process at the watershed level.
- Provide data about their jurisdiction and technical planning assistance in their roles as a watershed partner.

Implementation Role

- Update and amend existing land use plans to reflect the Watershed Balanced Growth Plan and establish consistency.
- If no comprehensive or master land use plan exists, develop such plans to the extent necessary to support implementation of the watershed plan.
- Adopt local ordinances/resolutions based on the guidance for applicable best practices and models recommended by the Balanced Growth Program.
- Direct local capital expenditures to support PCAs and PDAs in the watershed plan, as opportunities arise during the expansions or maintenance of existing infrastructure.

Local Coordination

- The Watershed Planning Partnership should consult with and involve local governments located within its planning jurisdiction concerning the designation of PCAs and PDAs and should ensure early and continuous public participation in the designation process.
- Each local government may propose to the partnership the designation of a PDA that would include the area within its jurisdictional boundary not otherwise designated as a PCA, and that may include additional unincorporated areas contiguous to its municipal boundary (with county and township consultation).
- The partnership should attempt to reach agreement with each local government located within its planning jurisdiction on the location and size of the PCAs and PDAs.

Ohio Balanced Growth Program

Fact Sheet: Priority Conservation Area (PCA)

What is it?

- A Priority Conservation Area is a locally designated area targeted for protection and restoration.

Who would designate a PCA?

- PCAs would be designated by the local Watershed Planning Partnership in consultation with local and state governments.
- PCAs would be designated as part of a Watershed Balanced Growth Plan.

What is the purpose of designating PCAs?

- Protect the ecological health of the watershed and tributaries.
- Provide a process by which areas containing environmental, natural, historic or archaeological resources of critical watershed concern may be identified and protected from substantial deterioration or loss.
- Agricultural areas can be included as PCAs or separately designated as Priority Agricultural Areas.
- Provide procedures by which areas of critical watershed concern may be designated.
- Protect and enhance public health, safety, and welfare.
- Guide state programs, policies, and investments that influence the location of conservation and/or development.

What factors could determine the designation of a PCA?

- Whether the ecological value of the area is of substantial watershed or basin wide significance.
- Whether the ecological functions provided by the area are of substantial watershed or basin wide significance.
- Whether the area is susceptible to significant natural hazards that would affect existing or planned development within it.
- Whether the area contains designated critical habitat or any threatened or endangered plant or animal species.
- Whether the area contains a unique, ecologically sensitive, or valuable ecosystem whose loss or decline would negatively affect watershed, state, or national biodiversity.
- Whether the area offers significant recreational, historical, or quality of life benefits.
- Whether the area offers opportunities for ecological restoration in urban areas.

Ohio Balanced Growth Program

Fact Sheet: Priority Development Area (PDA)

What is it?

- A Priority Development Area is a locally designated area where growth and/or redevelopment is to be especially promoted in order to maximize development potential, efficiently utilize infrastructure, revitalize existing cities and towns, and help restore Lake Erie.

Who would designate a PDA?

- PDAs are designated by the Watershed Planning Partnership in consultation with local and state governments.
- PDAs would be designated as part of a Watershed Balanced Growth Plan.

What is the purpose of designating PDAs?

- Provide a process whereby a Watershed Planning Partnership and local governments may coordinate future development in a mutually efficient and complementary manner.
- Encourage a pattern of efficient and contiguous development.
- Encourage preservation and adaptive reuse of urban infrastructure.
- Protect agricultural & forest lands, scenic areas, & other natural resources, living & nonliving, from sprawl.
- Identify areas where urban services are being or will be provided.
- Encourage growth where infrastructure capacity is available or committed.
- Reduce the costs of providing urban services.
- Guide state policies and investments that influence the location of development.

What types of areas could be designated as a PDA?

- The determination of what areas are designated as PDAs is decided by the Watershed Planning Partnerships.
- Examples of types of areas include; existing urban areas, industrial parks, special development districts, ports, brownfields, areas with existing or planned infrastructure, and undeveloped areas designated for future growth and development.

What factors could determine the designation of a PDA?

- Areas that are already characterized by urban growth and have adequate existing urban services.
- Existing urban areas that can be redeveloped.
- Areas primarily characterized by urban growth that are or will be served adequately by a combination of existing and future urban services provided by public or private entities.
- Other areas where growth will be encouraged and that can be served by future urban services in an efficient manner.
- The co-location of activities that are complementary to quality of life, such as proximity to natural areas, the interconnection of recreational corridors and alternative transportation systems.

Ohio Balanced Growth Program

Fact Sheet: Special Incentives

What are Financial and Technical Special Incentives?

These include existing funding sources and programs that have incorporated Balanced Growth-specific considerations in their applications processes.

How will the Financial and Technical Special Incentives be applied?

The Financial and Technical Special Incentives will be available in watersheds that have a state endorsed Balanced Growth Plan or in some cases are working on a plan. They are generally in the form of additional consideration (extra priority ranking, interest rate discounts, or special support) for funding applications that will implement specific activities in PDAs or PCAs. There are also special considerations for technical assistance from the state in local communities that are participating in Watershed Planning Partnerships who have completed an endorsed Watershed Balanced Growth Plan.

What is included in the Financial and Technical Special Incentives?

The following table is a short summary of what is offered as special incentives in Balanced Growth Watersheds. Complete descriptions of the programs, including the sponsoring agency and contact information, are contained in the State Program Inventory appendix to the Ohio Balanced Growth Strategy.

Special Incentives Summary Table

Coastal Management Assistance Grant Program	Technical and/or financial support for a Balanced Growth Plan or proposed projects in PCAs.
Watershed Coordinator Grant Program	Additional points to applicants that indicate they have or are working on a Balanced Growth Plan or proposed projects in PCAs (or PDAs as appropriate).
Recycling Market Development Grant Program	
Scrap Tire Grant Program	
Land & Water Conservation Fund Program	
Nature Works Program	



Balanced Growth

balancedgrowth.ohio.gov

Ohio Balanced Growth Program

Fact Sheet: Special Incentives

Clean Ohio Trails Program	
Recreational Trails Program	
Streams & Storm Water Program	Prioritize staff resources toward watersheds with endorsed Watershed Balanced Growth Plans.
Ohio Lake Erie Conservation Reserve Enhancement Program	Set aside an undetermined amount of funds from each fiscal year allocation of \$1 million toward PCAs, for eligible practices within eligible agricultural land use.
Grassland Restoration Program	Provide additional points to applicants working on a Balanced Growth Plan or who propose priority projects in a focus area.
Wetland Restoration Program	
Ohio Agricultural Easement Donation Program	Align for protection of PCAs or PAAs.
Agricultural Security Area	
Clean Ohio Agricultural Easement Purchase Program	Modify to support PCAs or PAAs.
Water Pollution Control Loan Fund	Align to support PCAs and PDAs including: <ul style="list-style-type: none"> • Funding for best water quality management practices for land development • Funding for municipal storm water best management practices • Funding for land and water conservation and restoration actions with water quality benefits. • Additional priority points for qualifying Balanced Growth projects



Balanced Growth

balancedgrowth.ohio.gov

Ohio Balanced Growth Program

Fact Sheet: Special Incentives

Fresh Water Loan Group	Additional <input type="checkbox"/> percent discount on loans.
Community Assistance Local Program	
Lake Erie Protection Fund	Priority for projects to develop and implement Watershed Balanced Growth Plans.
National Flood Insurance Program Community Rating System	Discounts to flood insurance premium rates on flood insurance policies sold for properties within the community.
Dam Safety Linked Deposit Program	Below market rate loans for the removal of dams.
Dam Safety Loan Program	
Floodplain Mgmt. Technical Assistance	FEMA approved flood mitigation plans result in local community eligibility for a full array of pre- and post-disaster mitigation funds and assistance. Inclusion of strategies and actions to address flood risk and protect floodplain resources in Balanced Growth Plans can easily be incorporated into mitigation plans.
Dam Safety Technical Assistance	
Statewide Geologic Mapping	Technical geological information in support of Balanced Growth Plans.
Ohio Coastal Erosion Area Remapping	
Side-scan Sonar Substrate Mapping	
166 Direct Loan Program	Strongly encouraged for businesses planning to expand within Priority Development Areas (PDAs).
Rapid Outreach Grant	
Roadwork Development (629) Account	
Ohio Job Creation Tax Credit	Tax credit would be strongly encouraged for businesses planning to expand within PDAs.

Ohio Balanced Growth Program

Fact Sheet: Special Incentives

208 Planning (aka State Water Quality Management Plan)	Provides a mechanism to strengthen local land use and sewer infrastructure planning; OEPA review of wastewater discharge permits and sewer PTIs in PDAs. “Specific prescriptions” regarding wastewater treatment and disposal options would be binding upon OEPA in permitting actions; permits must be consistent with approved 208 plans.
Clean Water Act Section 319 Implementation Grants Program	OEPA provides additional scoring/credit for projects that are proposed in watersheds where a Balanced Growth Plan has been completed.
Water Supply Revolving Account	Utilize priority point system for potential loan projects to recognize consistency with Balanced Growth Plans.
Small City Program	Participating in and implementing a Balanced Growth Plan will be criteria that goes into selection of projects.
Transportation Enhancements	

Ohio Balanced Growth Program

Fact Sheet: State Assistance Work Group

What is the role of the State Assistance Work Group?

One of the state incentives for local governments is the opportunity to work with state agencies through the State Assistance Work Group (SAWG). The State Assistance Work Group will be charged with assisting the Balanced Growth Watershed Planning Partnerships (WPPs) and participating local governments in identifying technical and financial resources that can support Priority Conservation Areas (PCAs) and Priority Development Areas (PDAs). The state agencies will assist in identifying sources of support, providing agency guidance on utilizing support, and promoting awareness of the local WPP intentions within the agencies.

Which state agencies are currently represented on the State Assistance Work Group?

The agencies currently represented include the Ohio Departments of Natural Resources, Development, Transportation, Agriculture, and Health, and the Ohio Environmental Protection Agency, along with the Ohio Water Development Authority. These members have prior knowledge and involvement in the Lake Erie Balanced Growth Program and will be considered the chartering members. Federal agencies that provide funding for development and conservation projects, other state agencies, and appropriate institutional partners will also be invited as deemed appropriate by the chartering member state agencies.

What are the specific goals of the State Assistance Work Group?

- Help Watershed Planning Partnerships and local governments identify the most appropriate programs from the State Program Inventory that will support the PDAs and PCAs in the watershed.
- Provide the agencies with knowledge and familiarity with each Watershed Balanced Growth Plan and the local development and conservation goals.
- Evaluate the impact of proposed rule changes by the state agencies and provide comments that best incorporate balanced growth considerations as new rules or rule revisions are developed. Review funding priorities to provide suggestions on how they can be supportive of Balanced Growth.
- Identify any additional programmatic resources or policy changes that will help align state programs and policies with Watershed Balanced Growth Plans.
- Develop public information resources (fact sheets and a website) to assist Watershed Planning Partnerships.

Ohio Balanced Growth Program

Fact Sheet: State Program Inventory

How will the State Program Inventory help the Watershed Planning Partnerships?

This inventory is intended to be a resource for Watershed Planning Partnerships to help identify programs that will support conservation in Priority Conservation Areas and development or re-development in Priority Development Areas (and agricultural preservation in Priority Agricultural Areas, if any). These are existing state programs that have been identified as specifically impacting land use change decisions. The intent is that the state will consider the existence of PCAs and PDAs in the use of these programs to support land use planning and land use change that is beneficial to the local communities and to Ohio's waters and watersheds as outlined in the Ohio Balanced Growth Program Strategy.

How is the State Program Inventory presented?

The State Program Inventory is a list of state programs compiled by whether or not they will support Priority Conservation Areas or Priority Development Areas. The list is structured by conservation or development effect, and then by three factors: infrastructure, direct site impact, and planning/technical assistance services. It is currently contained as an appendix in the draft Ohio Balanced Growth Strategy.

What is included in the State Program Inventory?

- **Conservation Programs** – there are a total of 45 state programs and funding sources in the Inventory that could be used to support conservation in the PCAs. This includes one program for Metro Park infrastructure, 30 that are site specific (for example, site acquisition or restoration), and 14 for services (such as forestry or watershed action plan technical assistance).
- **Development Programs** – there are a total of 109 state programs and funding sources in the Inventory that could be used to support development or redevelopment in the PDAs. This includes 33 programs for infrastructure (primarily transportation and water, through ODOT, OWDA, and OEPA), 65 that are site specific (for example, various community development programs), and 11 for services (such as minority business assistance or planning programs).

It should be noted that a few programs appear on both lists, since they could be used to support either conservation or development (for example, the ODNR – Division of Soil & Water Resources, Streams and Storm Water Program serves a range of purposes).

Ohio Balanced Growth Program

Fact Sheet: State Roles

State support for the Balanced Growth planning process

- The state will provide information on the restoration goals for the Lake Erie and Ohio River basins, the objectives of the Balanced Growth program and guidance for creating Watershed Planning Partnerships.
- The state will provide technical assistance and facilitation to assist local governments in the formation of the partnerships.
- The state provides financial support for watershed planning through the Lake Erie Protection Fund and other state programs.
- The state should assist WPPs in obtaining grants from outside sources.
- The Lake Erie Commission and Ohio Water Resources Council have developed a Balanced Growth planning toolkit to assist local Watershed Planning Partnerships. This toolkit includes methodologies for designating PCAs and PDAs, assistance on watershed planning, and a GIS-based decision support system.
- The state, through the State Assistance Work Group, has also developed a technical support network to assist Watershed Planning Partnerships in creating their Watershed Balanced Growth Plans.

Public Education

- The Lake Erie Commission and Ohio Water Resources Council coordinate existing watershed education programs and develop new educational resources to educate and involve citizens and public officials in the Balanced Growth Program.
- These educational efforts include an orientation program for Watershed Planning Partnerships, an information package communicating the benefits of the Balanced Growth Program, and a special outreach to organizations of local government officials, planning, design, and development professionals to expand awareness of Balanced Growth principles.

Plan Endorsement

The state reviews and endorses completed Watershed Balanced Growth Plans according to their agreement with existing state strategies, whether the plan identifies PCAs and PDAs, whether the planning process was open and inclusive, and whether the plan achieved local consensus. The state, through the Lake Erie Commission and the Ohio Water Resources Council, also provides guidance on the organization and presentation of information with the plan to assist in making it useful to the intended audiences.

Ohio Balanced Growth Program

Fact Sheet: Streamlining & Predictability

Why would streamlining and predictability of state regulatory programs be an incentive?

The unpredictability and long time frame typically needed to secure permits presents significant challenges to successful development practice. Extended permit review periods and conflicting information across regulatory agencies jeopardizes private developer ability to finance projects reasonably and bring projects to completion. Therefore, state efforts to streamline these processes and make them more predictable would serve as an incentive for private developers and local communities if they could anticipate streamlined, predictable decision making to encourage development or redevelopment in the PDAs and consistently greater levels of difficulty for equivalent projects in PCAs.

Which state regulations can be streamlined and made more predictable?

- A rules package for stream mitigation, wetland mitigation, and 401 certification is in the process of being developed by OEPA. Development of these rules should provide improvements to predictability and timeliness in the permitting process.
- Ohio EPA is in the process of developing and issuing general NPDES permits for a variety of discharges in order to increase efficiency and to help make it easier for various dischargers to obtain an NPDES permit.
- Programs that require consistency between federal, state or local actions and specifically adopted plans (e.g. Ohio Coastal Management Program and Section 208 Plans) are another method that Watershed Planning Partnerships and local governments can use to assure that state and federal actions are consistent with their Watershed Balanced Growth Plans. Programs that depend upon local recommendations will reference consistency with a locally adopted and state endorsed Watershed Balanced Growth Plan where such a plan has been completed.
- The State Assistance Work Group will look at additional methods to provide more advance predictability pertaining to site-related decisions. While these regulatory changes will generally be available statewide, they also will address the need for state regulatory streamlining and predictability in Balanced Growth Watersheds.

Ohio Balanced Growth Program

Fact Sheet: Watershed Balanced Growth Plans

Planning criteria

- Watershed Balanced Growth Plans will be developed by Watershed Planning Partnerships.
- Watershed Balanced Growth Plans are meant to augment and harmonize with local comprehensive plans - not replace them.
- Priority areas should be identified based on measurable criteria that affect Ohio's watersheds.
- It is hoped that local land use plans will be adapted to conform to the watershed plans.

Content of plans

- A specific statement of how the Watershed Balanced Growth Plan will help achieve the goals and objectives of the Ohio Balanced Growth Strategy, while promoting economic development and quality of life in the watershed.
- The identification of Priority Conservation Areas within the watershed to protect critically important ecological, recreational, agricultural, heritage, public access, and other critically important areas.
- The identification of Priority Development Areas within the watershed, which will be locally designated areas where growth and/or redevelopment should especially be promoted.
- Documentation that justifies the designation of Priority Development Area and Priority Conservation Areas.

Factors to be considered

- Population and population distribution in the watershed.
- Natural resources, inventories and assessments which may include air, water, open spaces, public access, scenic corridors, and viewsheds, forests, soils, rivers, and other waters, shorelines, fisheries, wildlife, and minerals.
- The amount, type, intensity or density, and general location within the watershed of various types of land uses and projections of land uses for the watershed.
- The economy of the watershed, which may include amount, type, general location and distribution of commerce and industry within the watershed, the location of employment centers, and which should include analyses of trends of projections of economic activity.
- Amount, type, quality, affordability, and geographic distribution of housing among local government units in the watershed.
- General location and extent of existing or currently planned major transportation facilities of all modes, and utility, educational, recreational, cultural, and other facilities of significance. This includes storm water, drinking water, and sewer system infrastructure.
- Geology, ecology, and other physical factors of the watershed, including land areas in the watershed subject to natural hazards.
- The identification of features of significant statewide or watershed architectural, scenic, cultural, historical, or archaeological interest.
- Amount, type, location, and quality of agricultural lands.

Ohio Balanced Growth Program

Fact Sheet: Watershed Planning Partnerships

What is it?

A Watershed Planning Partnership is the organization within a watershed that will assemble for the purpose of preparing a Watershed Balanced Growth Plan. The partnership should be a regional effort that, depending on the watershed, can be organized in flexible ways to respond to local conditions. Their work should be open, inclusive, and focused on consensus building.

Composition?

- While a Watershed Planning Partnership's participation is voluntary, they need to be inclusive of all interests, including representatives from local governments, planning agencies, councils of governments, special purpose authorities, non-governmental organizations, and other stakeholder groups.
- To assist with coordination and provide input, state agency representatives should be involved as nonvoting, ex-officio members.
- The partnerships can contract with existing planning agencies, universities, nonprofit organizations, or private consultants for staff support.

How will Watershed Planning Partnerships guarantee participation?

- Watershed Planning Partnerships must demonstrate the support of local governments with land use planning and implementation authority; and should seek to meet the following threshold targets:
- Representation from at least 75% of the geographic land area of the watershed.
- Representation from at least 75% of the population of the watershed.
- Representation from at least 75% of the local governments that have land use control authority in the watershed.

What are the benefits of participating in a Watershed Planning Partnership?

- Watershed Planning Partnerships will gain access to extra state incentives made available to PCAs and PDAs
- They will control the designation of PCAs and PDAs.
- They will gain greater ability to manage development because their local plans will be supported by technical studies, information, data, as well as be coordinated with a larger regional planning effort.
- They will have greater access to planning information and knowledge about the community's future.
- They will help make themselves and communities throughout the watershed more competitive by creating a higher quality of life and by making development decisions more predictable.
- They will have access to tools and technical assistance to improve planning and reduce infrastructure costs.

Ohio Balanced Growth Program

Fact Sheet: Watershed Action Plans & Watershed Balanced Growth Plans

What is a Watershed Action Plan?

- A watershed action plan is a locally written plan that is meant to guide activities toward the restoration and maintenance of the chemical, physical and biological integrity of water resources within the watershed. Implementation of these plans may include runoff pollution control measures, stream restoration projects such as dam removal and stream bank stabilization, adopting local policies designed to protect water resources, and/or protecting high quality resources through easement purchase and other voluntary set-aside programs.

What is a Balanced Growth Watershed Plan?

- A balanced growth watershed plan is a voluntary locally developed plan that designates priority conservation areas (PCAs) and priority development areas (PDAs) within communities that drain to a common watershed. A balanced growth plan identifies local planning and development goals and priorities and communicates them to state agencies. Implementation of balanced growth plans is undertaken by local jurisdictions through integration with local planning processes. A balanced growth plan is an opportunity for local governments to direct state incentives and programs to support their locally defined land use objectives.

How are the two types of plans the same?

- Both plans are developed at a watershed scale by a local watershed partnership, they are meant to improve water quality, and are voluntary in nature. Both plans require state endorsement to benefit from state programs.

How are the two types of plans different?

- A watershed action plan is meant to address physical, chemical, and biological impacts on local water resources. Often, a watershed action plan is written in response to a Total Maximum Daily Load (TMDL) report or other source of water quality data. A watershed action plan takes a holistic approach towards the improvement of water quality. A balanced growth plan, while aimed at improving water quality, focuses primarily on land cover and land use information. A balanced growth plan specifically targets the location of conservation and development land uses within a watershed and puts emphasis not just on water quality, but on economic development and future urban growth as well.

How is the endorsement process different for the two types of plans?

- A watershed action plan is reviewed and endorsed by the Ohio Environmental Protection Agency (EPA) and the Ohio Department of Natural Resources (ODNR). A watershed action plan is reviewed for content, public involvement, and outcomes, and must meet requirements in A Guide to Developing Local Watershed Action Plans in Ohio: Appendix 8. Within the Lake Erie watershed, there is an additional requirement to address

Ohio Balanced Growth Program

Fact Sheet: Watershed Action Plans & Watershed Balanced Growth Plans

Coastal Management Measures administered through ODNR at the state level that satisfy National Oceanic & Atmospheric Administration (NOAA) requirements at the Federal level.

- A balanced growth plan is endorsed by the Ohio Lake Erie Commission (OLEC) or Ohio Water Resources Council (OWRC). A balanced growth plan is reviewed to ensure that the process was open, was based on sound science, and is not intentionally contrary to specific state or local projects which are planned or currently underway. It is not the intention of the review process to have the State of Ohio second guess local selection of PCAs and PDAs; however the process and the outcomes of the project must meet the fundamental goal of allowing for future development and supporting the protection and restoration of Ohio's watersheds.

How are the two plans related?

- A watershed action plan provides information that is useful in the development of a balanced growth plan, but is not acceptable for endorsement as a balanced growth plan, as watershed action plans are not required to designate PCAs & PDAs. A balanced growth plan may be included as a component of a watershed action plan.

Why are there two watershed planning processes?

- Watershed action plans are written to address local water quality impairments and provide a course of action for improving water quality. A balanced growth plan is one tool that a watershed group can use to improve water quality, through the designation of priority areas for conservation and development.

Should a watershed develop both plans?

- This is a local decision! A watershed action plan should be written if your local watershed is facing impairment for its designated uses, such as boating, fishing, or drinking. Most if not all watersheds in Ohio should eventually have a watershed action plan written for either the improvement or protection of their water resources. Balanced growth plans should be focused on watersheds that are experiencing or are likely to experience land use change either due to urbanization or the redevelopment of an urbanized watershed.

Which plan should we write first?

- There is no predetermined order for the development of these two plans. Several factors should be considered when making a local decision about which plan(s) to write, and when to write them. These include the capabilities of the local watershed group, the extent of development within a watershed, the quality of the water resource, the desire of the local communities to participate in either process, or the resources available locally. Each plan offers benefits to the local watershed communities upon endorsement, and the applicability of these specific benefits should also be considered.

Special Incentives: These are the 28 state programs that include special consideration for Balanced Growth participating communities. A Balanced Growth participating community is one that has passed a resolution of support for a Watershed Balanced Growth Plan that has been endorsed by the state. Underline indicates general category of targeted applicants (see program details for specific eligibility requirements).

More information about each program, including contact information, is available in the complete Inventory of State Programs, Appendix C of the Ohio Balanced Growth Strategy (posted online at <http://balancedgrowth.ohio.gov/BalancedGrowthStrategy.aspx>).

Program	Type	Agency	Purpose	Incentives
Clean Ohio Agricultural Easement Purchase Program PAA/PCA	Grant	ODA	Allows <u>counties, townships, and land trusts</u> to apply to ODA on behalf of farmers for the purchase of agricultural easements that preserve productive farmland for future generations.	Applicants receive up to 3 points for the plan in a participating BG community, and up to 5 points for projects in a participating BG community located in a PCA or PAA in the Tier I part of the review (out of 100 pts). Applicants may receive additional points in Tier II essay question about planning (up to 10 pts of 50 pts)(150 pts total).
Agricultural Security Area PAA/PCA	Tax Credit	ODA	ASAs promote agricultural retention by creating special areas in which agriculture is encouraged and protected. ASAs provide certain benefits to communities and <u>farmers</u> , including protection from non-agricultural development, ensuring a critical mass of land to help keep farming viable, and possible tax benefits for investing in new real agricultural property.	Counties with participating communities may be able to implement local incentives for the ASA in support of PAAs. The ODA Office of Farmland Preservation can assist counties in marketing and/or enrolling properties that support PAAs.
Clean Water Act Section 319 Implementation Grants PCA	Grant	OEPA	Provides financial assistance to <u>local soil and water conservation districts, local watershed groups, local governments and others</u> to implement watershed management actions designed to eliminate impaired waters and reduce nonpoint source pollution in Ohio.	Balanced Growth communities can receive up to two additional points out of a possible 62 on review criteria for proposed projects.

Program	Type	Agency	Purpose	Incentives
Water Pollution Control Loan Fund PCA/PDA	Loan	OEPA	Provides low-cost financing and technical assistance to <u>local governments</u> for the planning, design and construction of wastewater facilities improvements, and for the control of nonpoint source pollution of surface and ground waters.	Projects that implement a qualifying sustainable growth plan will receive an additional 3 points in their rating scores (out of a typical 36 points). See 2010 WPCLF Program Management Plan, Page 11.
Water Resource Restoration Sponsor Program (WRRSP) of the Water Pollution Control Loan Fund PCA	Grant	OEPA	Provides funds to <u>political entities such as municipalities or park districts, or not-for-profit organizations</u> , for restoration / protection of aquatic habitat resources: e.g., stream corridor restoration, natural channel design, acquisition of acreage containing high quality wetlands, riparian corridor, or headwater streams.	Projects that implement a qualifying sustainable growth plan will receive an additional 3 points in their rating scores (out of a typical 36 points). See 2010 WPCLF Program Management Plan, Page 11.
Water Supply Revolving Loan Account PDA	Loan	OEPA	Provides low interest loans to <u>eligible public water systems</u> to fund improvements to eliminate public health threats and ensure compliance with federal and state drinking water laws and regulations.	A Balanced Growth Plan may qualify as an Endorsed Protection Plan in the Bonus Points for Effective Management section of the project rankings (up to 5 points). See Final DWAF PY 2011 Program Management and Intended Use Plan, Page 30.

Program	Type	Agency	Purpose	Incentives
Section 208 Planning (State Water Quality Management Plan) PCA/PDA	Regulatory	OEPA	Meets requirements in federal regulations; applies knowledge of the water quality problems and threats in a region in developing plans that identify what steps will be taken, by what entities and by when to help improve and maintain good water quality. Provides a mechanism for <u>local communities</u> to strengthen local land use and sewer infrastructure planning; OEPA review of wastewater discharge permits and sewer PTIs in PDAs.	BG participating communities may request that areawide agencies in charge of local 208 plans incorporate features from the local BG plans. "Specific prescriptions" regarding wastewater treatment and disposal options would be binding upon OEPA in permitting actions; permits must be consistent with approved 208 plans.
Ohio Coastal Management Assistance Grant Program PCA/PDA Planning	Grant	ODNR	Provides financial assistance to <u>local governments, state agencies, non-profits and educational institutions</u> for projects that preserve, protect and enhance Lake Erie coastal resources and/or support their sustainable use. Program only available in Lake Erie watershed.	Balanced Growth communities can receive up to six additional points out of a possible 140 on review criteria for proposed projects.
Watershed Coordinator Grant Program PCA	Grant	ODNR, OEPA	Provides <u>non-profits and local governments</u> with four year grants to employ watershed coordinators to plan nonpoint source pollution programs via stakeholder compiled watershed action plans.	No additional points. However, a successful balanced growth plan would reflect well in the application process.
Market Development Grant PDA	Grant	ODNR	Provides grant funds to <u>Ohio businesses and non-profit organizations</u> for costs associated with the development of Ohio markets for recycled or recyclable materials.	Balanced Growth participants should indicate how a proposed market development project relates to BG, thereby strengthening the application.

Program	Type	Agency	Purpose	Incentives
Scrap Tire Grant PDA	Grant	ODNR	Provides grant funds to <u>Ohio businesses and educational institutions</u> for costs associated with the development of markets for scrap tires or scrap tire material.	Balanced Growth participants should indicate how a proposed scrap tire project relates to BG, thereby strengthening the application.
Land & Water Conservation Fund PCA	Grant	ODNR	Provides financial assistance to <u>local governments</u> to acquire and/or development properties for outdoor recreation.	Balanced Growth communities can receive up to 10 additional points out of a possible 145 on review criteria for proposed projects.
Nature Works PCA	Grant	ODNR	Provides financial assistance to <u>local governments</u> to acquire and/or development properties for outdoor recreation.	Balanced Growth communities can receive up to 10 additional points out of a possible 150 on review criteria for proposed projects.
Streams & Storm Water Program PCA/PDA Planning	Tech. Assist.	ODNR	Provides technical assistance to <u>local government, business and individuals</u> in the areas of site development, storm water management, stream mitigation, rehabilitation and restoration (mitigation review and design assistance).	Prioritize staff resources toward watersheds with endorsed Watershed Balanced Growth Plans.
Statewide Geologic Mapping Program PCA/PDA Planning	Tech. Assist.	ODNR	Performs the necessary field, laboratory and administrative tasks to map and make public reports on the geology and mineral resources of each county in Ohio.	Technical (geological) information in support of Balanced Growth Plan, including special studies that may be requested by WPPs.
Recreation Harbor Evaluation Program PDA	Grant	ODNR	Provides financial assistance to <u>local political subdivisions</u> on the Ohio River and Lake Erie and its tributaries to address dredging needs for recreational boating harbors and channels.	Balanced Growth communities can receive up to 15 additional points out of a possible 115 on review criteria for proposed projects.

Program	Type	Agency	Purpose	Incentives
Ohio Lake Erie Conservation Reserve Enhancement Program (CREP) and Scioto River Watershed CREP PAA/PCA	Grant	ODNR	Improves water quality by reducing sediment pollution and field runoff through the installation of filter strips, riparian buffers, wetland, hardwood trees, wildlife habitat and field windbreaks by <u>farmers</u> .	Prioritize some remaining state matching funds and in-kind staff assistance for Balanced Growth communities.
National Flood Insurance Program Community Rating System PCA	Insurance Discount	ODNR	Provides subsidized flood insurance in <u>local communities</u> that adopt and enforce flood damage reduction regulations. Also, communities participating in the NFIP have access to all aspects of disaster assistance. The CRS rewards those communities that are doing more than the minimum National Flood Insurance Program requirements to help their residents prevent or reduce flood losses.	Balanced Growth communities are, by definition, likely to be performing land use planning activities to forward sustainable development practices. Communities participating in CRS can apply for points based on BG planning activities to achieve discounted flood insurance premiums.
Floodplain Mgmt. Tech Asst. Program PCA Planning	Tech. Assist.	ODNR	Provides technical and planning assistance to <u>local governments</u> in order to reduce flood loss and preserve natural benefit and function of floodplain resources in Ohio.	NFIP participation and local adopted floodplain management regulations gives communities eligibility for state and federal disaster relief funds. Additionally, NFIP participating communities with FEMA-approved hazard mitigation plans are eligible for an array of pre- and post-disaster mitigation funds. BG plans may support these requirements.
Dam Safety Technical Assistance PCA/PDA Planning	Tech. Assist.	ODNR	Provides technical assistance to <u>local communities</u> about the location and extent of dam failure inundation areas.	Inclusion of strategies and actions to address dam failure risk in Balanced Growth Plans can easily be incorporated into mitigation plans.

Program	Type	Agency	Purpose	Incentives
Ohio New Markets Tax Credit PDA	Tax Credit	ODOD	Helps finance business investments in low-income communities by providing investors (<u>community development entities</u>) with state tax credits in exchange for delivering below market rate investment options to Ohio businesses.	Project located in PDA can be used to meet a required program objective receiving weighted preference in application.
Clean Ohio Revitalization Fund – Sustainable Reinvestment Pilot Track PDA	Grant	ODOD	<p>Once a site has been designated a brownfield, the Clean Ohio Revitalization Fund can provide grant money to <u>local governments</u> for various activities, including Asbestos Surveys, Phase II Environmental Assessments, demolition, removal of contaminated soil and groundwater, and a host of other remediation strategies.</p> <p>This track provides up to \$1.5 million for the cleanup, demolition, and infrastructure activities for projects in one of the three new categories: Sustainable Infrastructure (Signature Parks and Green Infrastructure), Urban Waterfronts and Cleanfields/Brightfields (Wind and Solar).</p>	Project located in a PDA meets the criteria for 'Development Plan in Place' and receives up to three of 70 points in the base calculation.

Program	Type	Agency	Purpose	Incentives
Clean Ohio Revitalization Fund – Known End User Track PDA	Grant	ODOD	Once a site has been designated a brownfield, the Clean Ohio Revitalization Fund can provide grant money to <u>local governments</u> for various activities, including Asbestos Surveys, Phase II Environmental Assessments, demolition, removal of contaminated soil and groundwater, and a host of other remediation strategies. All cleanup activities (including acquisition and infrastructure) are eligible costs for projects with a known end use that are utilizing the Known End Use Track of the application.	Project located in a PDA receives up to three points in the base calculation.
Clean Ohio Revitalization Fund – Redevelopment Ready Track PDA	Grant	ODOD	Once a site has been designated a brownfield, the Clean Ohio Revitalization Fund can provide grant money to <u>local governments</u> for various activities including Asbestos Surveys, Phase II Environmental Assessments, demolition, removal of contaminated soil and groundwater, and other remediation strategies.	Project located in a PDA receives up to three points in the base calculation.
Lake Erie Protection Fund PCA/PDA Planning	Grant	OLEC	Provides funds to <u>non-profits or units of government (local, state, or federal, including universities)</u> for research that will benefit Lake Erie or to supplement state commitments to policies and programs pertaining to water quality and resource protection in the Lake Erie watershed.	Funding is reserved for one Balanced Growth project per year of up to \$15,000; additional Balanced Growth projects will receive priority consideration in funding decisions.
Dam Safety Loan Program PDA	Loan	OWDA	Provides below market rate loans to <u>local governments</u> to protect dam structures.	Additional ½ percentage point discount on loans to BG participating communities.

Program	Type	Agency	Purpose	Incentives
Fresh Water Loan Group PDA	Loan	OWDA	Provides market rate loans to <u>local governments</u> that are making improvements to their drinking water treatment, wastewater treatment or storm water treatment systems.	Additional ½ percentage point discount on loans to BG participating communities.
Community Assistance Loan Program PDA	Loan	OWDA	Provides below market rate loans to <u>local governments</u> that are making improvements to their drinking water treatment or wastewater treatment systems.	Additional ½ percentage point discount on loans to BG participating communities.



Appendix D

Related Materials



**Lake Erie Unit
Division of Surface Water**

Biological and Water Quality Study of Furnace Run Watershed



February 2007
NEDO/2007-02-01

Ted Strickland, Governor
Chris Korleski, Director

This project funded in part by a grant from U.S. EPA
Great Lakes National Program Office

Biological and Water Quality Study of Furnace Run Watershed



Furnace Run at RM 1.0. Photo by Dave Altfater

**Kelvin Rogers
Dave Altfater
Mike Gray**

February 2007
NEDO/2007-02-01

Ohio Environmental Protection Agency
Lazarus Government Center
50 West Town Street, Suite 700
P.O. Box 1049
Columbus, Ohio 43216-1049

Contents

1.0 Project Summary

2.0 Background

3.0 Historical Data

4.0 2006 OEPA Survey Results

4.1 Water Chemistry

4.2 Aquatic Life and Habitat

5.0 Conclusions and Recommendations

References

Appendices

1. Ohio Turnpike Commission Water Quality Sampling Data 2001 – 2006.
2. OEPA 2006 Furnace Run Survey Water Quality Sampling Data
3. OEPA IBI Scoring Sheets
4. OEPA Raw Fish Data Sheets
5. OEPA Raw Bug Data Sheets
6. OEPA QHEI Components Data Sheet

Cover Photo: Everett Road Covered Bridge, Cuyahoga Valley National Park, Ohio.
Photo by Kelvin Rogers, Ohio EPA, Northeast District Office, Twinsburg, Ohio

Special thanks to
Steve Tuckerman and Julie Letterhos of Ohio EPA for their technical review
and Ohio EPA intern Jim Hamski for assistance in water sample collection

1.0 Project Summary

In 2006 the Ohio Environmental Protection Agency (Ohio EPA) conducted a biological and water quality survey of the Furnace Run watershed, a tributary of the Cuyahoga River. The purpose of this study was to provide an updated environmental status report of the area. This information will be used to appropriately assess the level of beneficial use impairment for aquatic life and fish habitat in this section of the Cuyahoga River Area of Concern (AOC).

Prior sample efforts by Ohio EPA in 1991 and 1996 indicated that this watershed is in full attainment of biological and water quality standards. However, a study conducted in 2003 by Metroparks Serving Summit County found that Rock Creek, a tributary to Furnace Run, was in non-attainment of fish and macroinvertebrate community aquatic life criteria. This was attributed to high dissolved solids levels resulting from slag leachate during and immediately following construction of the Interstate 80 interchange near this area in 2000-2001.

The Ohio EPA collected aquatic life community data, habitat information and water quality samples at seven sites within the Furnace Run watershed. Additional fish community data were collected at one site at the mouth of Furnace Run as part of a separate project. Figure 1 contains a map of the sampling area and collection sites.

Grab water samples were collected three times at the seven sites in the Furnace Run watershed using the protocols and procedures outlined Ohio EPA (2006). Field water quality data was collected at each site for conductivity, dissolved oxygen (D.O.) pH, and temperature.(Ohio EPA, 2006). General stream water quality parameters, including nutrients and total metals (including mercury) were analyzed at the Ohio EPA laboratory per the standard operating procedures in Ohio EPA (2001). A total of 26 samples, including those for quality control purposes, were analyzed.

The Ohio EPA collected fish community data from seven of the eight sites in the watershed (Figure 1). The fish sampling at each site was from zones, each between 150 and 200 meters in length. Two passes or collections were made during the survey at six of the sites; only one pass was completed at the site located at the mouth of Furnace Run (RM 0.20) as part of a separate project. Electro-fishing gear was utilized for fish collection. Fish were identified to species, counted, weighed (only at RM 0.2) and checked for deformities, eroded fins, lesions and external tumors (DELTs).

The macroinvertebrate communities at six Furnace Run sites and one Rock Creek site were sampled using qualitative (multi-habitat composite) and quantitative (artificial substrate) sampling protocols. Results are summarized in Table 3.

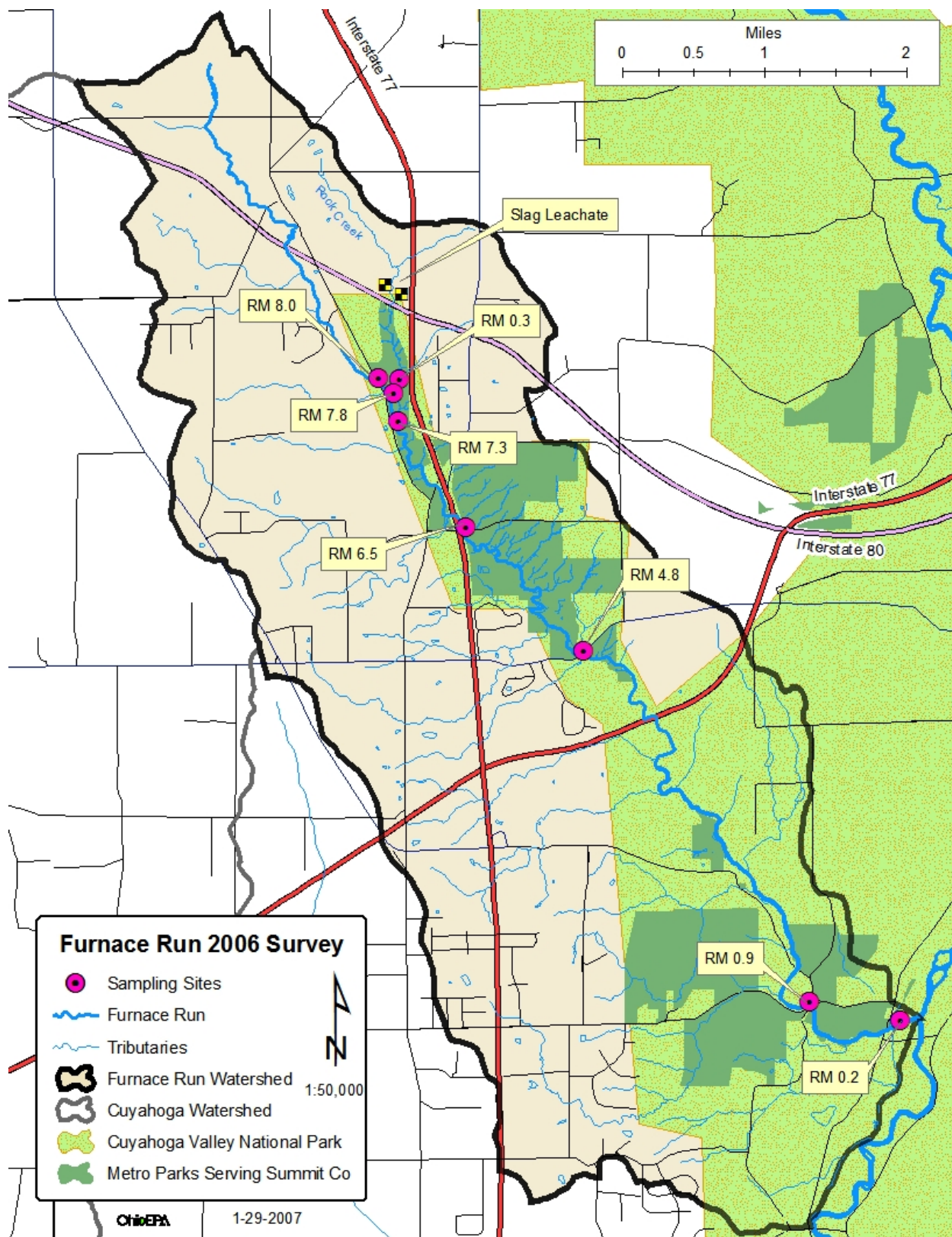


Figure 1. Furnace Run Watershed - 2006 Survey Sampling Locations

The artificial substrate samplers were originally placed in the stream on July 5-6, 2006. High flows from July storms resulted in the loss of most of the samplers. The samplers were reset on August 18, 2006. Later storms resulted in the loss of the samplers from the RM 4.8 and 0.9 sampling locations. Only qualitative samples were used to evaluate the macroinvertebrate community from these locations.

Qualitative Habitat Evaluation Indices (QHEI) data were collected at seven of the eight sites from zones approximately 150 meters in length. The site from which QHEI data were not collected was upstream of the Everett Road covered bridge (RM 0.9); qualitative macroinvertebrate data was the only aquatic life data collected at this site due to loss of the quantitative samplers. No fish community data were collected at this site due to the proximity of sampling conducted at RM 0.2.

All sampling methods, protocols, and procedures utilized during the biological survey were conducted in accordance with the Quality Assurance Project Plan (QAPP) dated March 2006 for the West Branch (Black River AOC) / Furnace Run (Cuyahoga River AOC) Assessment.

2.0 Background

In the 1987 amendment to the Great Lakes Water Quality Agreement the International Joint Commission identified the Cuyahoga River as one of 42 Great Lakes areas that were contributing to the degraded condition of the Great Lakes. Canada and the United States agreed to develop Remedial Action Plans or RAPs to restore the beneficial uses within these 42 Areas of Concern (AOCs). An AOC is one failing to meet objectives of the U.S.-Canada Great Lakes Water Quality Agreement. These AOCs are the State's most polluted and environmentally impacted rivers which empty into Lake Erie. Ohio's RAP program addresses the restoration of the beneficial uses in the Ohio AOCs.

There are four Areas of Concern (AOCs) in Ohio; Ashtabula River, Black River, Cuyahoga River and Maumee River. Ohio EPA is responsible for working with local stakeholders to ensure that RAPs are developed and implemented in these AOCs. The Ohio EPA is seeking to supplement stream habitat and fish community data in the Furnace Run subwatershed of the Cuyahoga River AOC in order to accurately determine the degree of beneficial use impairment for fish and macroinvertebrate communities and fish habitat within this watershed.

Furnace Run originates in Brecksville, Broadview Heights and Richfield in northern Summit and southern Cuyahoga counties in northeast Ohio. It flows approximately 10.4 miles southeast through Bath and Boston townships to meet the Cuyahoga River at river mile (RM) 33.08. It drains approximately 35 square miles of predominately suburban lands. A 2001 satellite land cover analysis determined that approximately 14 % of the watershed is considered urbanized with generally impervious surfaces (Figure 2). The remaining 86 % of the watershed is comprised primarily of wooded (47%), grass/agricultural (34%) shrub/scrub (7%) cover (Cuyahoga River RAP, 2004).

1991 and 1996 Ohio EPA surveys found Furnace Run to be in FULL Attainment of the current Warm Water Habitat (WWH) aquatic life use designation.

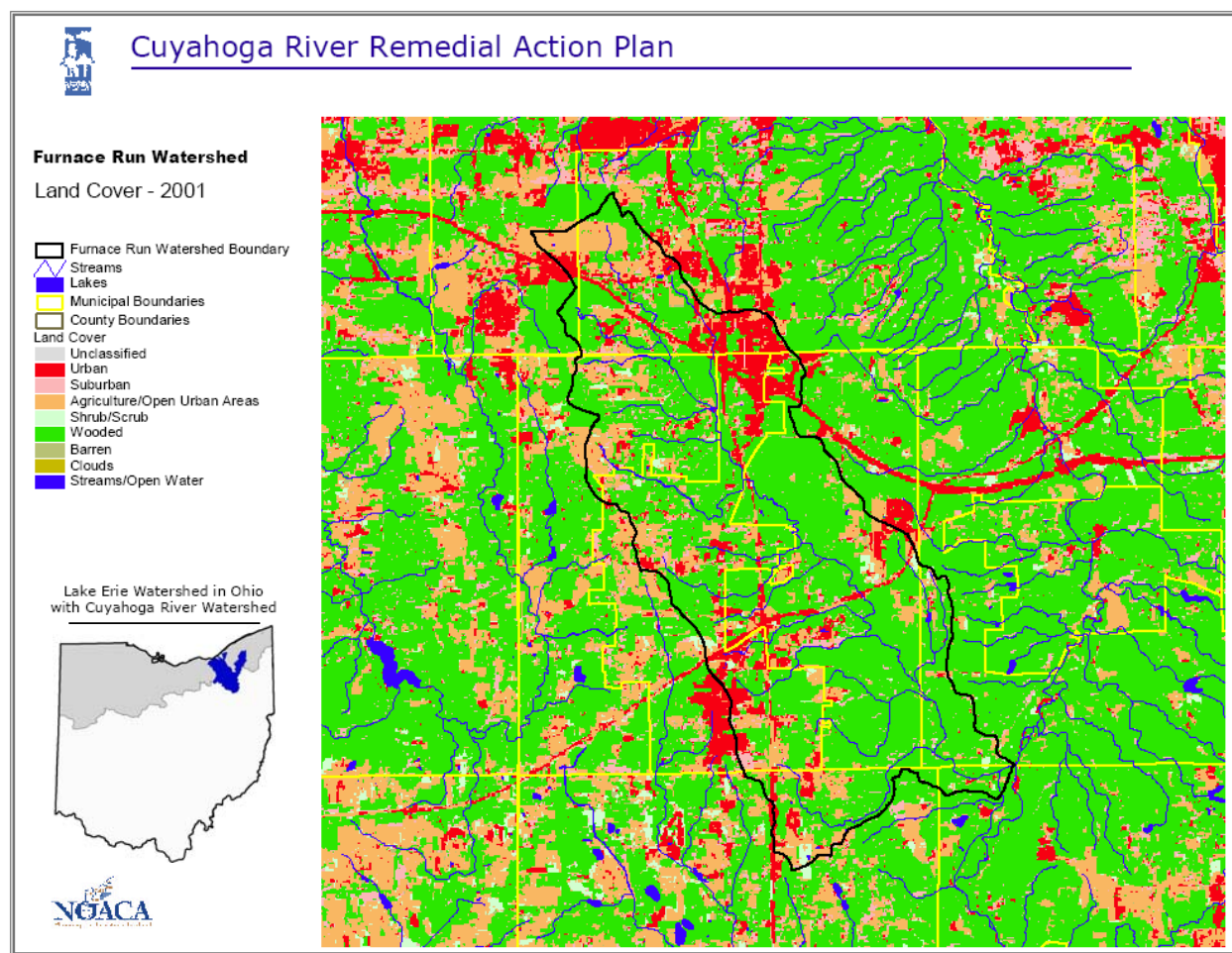


Figure 2. Land Cover map of Furnace Run watershed

Furnace Run Metro Park, operated by Metroparks Serving Summit County, is located within the Furnace Run watershed. It currently consists of seven tracts of land totaling approximately 870 acres in Richfield. 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 disjunct from the remainder of the park and ecologically separated by Interstate 271. Furnace Run Metro Park is contiguous with, and often considered part of, Cuyahoga Valley National Park (CVNP), which contains 30,000 acres of wetland and forest along the Cuyahoga River from Akron to Cleveland. Metro Parks is responsible for the management of these natural areas. In 2003 they contracted a natural resource management study to provide baseline ecological data and ensure continued protection of the resource (Metroparks Serving Summit County, 2004).

Furnace Run lies within the area covered by the Lower Cuyahoga River Total Maximum Daily Load (TMDL) report, which was approved by U.S. EPA on September 26, 2003. TMDLs identify and evaluate water quality problems in impaired water bodies and propose solutions to bring those waters into attainment. Because of earlier identification as being in FULL attainment with Ohio Water Quality Criteria it was not specifically included within the report.

3.0 Historical Data

The 2003 survey conducted by Enviroscience, Inc. for Metroparks Serving Summit County included aquatic life (fish and macroinvertebrate) analyses consistent with Ohio EPA protocol at five stream sites, including one in Rock Creek, a small tributary of Furnace Run. All of the Furnace Run sites were found to be in FULL Attainment with WWH, with two sites exhibiting a fishery community indicative of Exceptional Warm Water Habitat (EWH). Although habitat scores indicated that Rock Creek was also capable of supporting higher level aquatic life communities, it was not in attainment of WWH standards. Historical water quality problems originating from upstream of the site after the 1996 OEPA survey combined with channelized conditions immediately downstream of the site at that time may have limited Rock Creek's biological performance (Metroparks, 2004). See Table 1 for historical sampling results from Ohio EPA and Metroparks reports.

Rock Creek and Furnace Run have been impacted by slag leachate from construction of the Ohio Turnpike/Interstate 77 interchange in 2000. Two leachate sources and four sites within the Rock Creek/Furnace Run watershed have been monitored monthly for water quality by the Ohio Turnpike Commission (OTC) since 2001 (see Appendix 1). Test results from the two slag leachate sites indicate this material may have a significant negative impact on aquatic life; from June 2001 to June 2006 pH values have ranged from 6.2 - 13.5 S.U. Field measured dissolved oxygen and conductivity levels have ranged from 0.0 - 14.4 mg/l and 1230 - 48,800 umhos/cm (in 2004) respectively. Laboratory results for sulfate, COD and BOD5 have ranged from 60 - 3188 mg/l, 28 - 6900 mg/l and 5 - 2600 mg/l respectively.

Water quality samples collected by the OTC at the Rock Creek site (RM 0.4) indicate an increasing negative impact by this pollutant source over time. Conductivity values ranged from 924 – 2500 umhos/cm in 2001 and from 2720 – 7320 umhos/cm in 2006. This is well above the OEPA water quality standards for dissolved solids (1500umhos/cm Outside Mixing Zone Average). Sulfate values ranged from 45 – 140 mg/l in 2001 and from 91 – 259 mg/l in 2006.

Table 1. Aquatic life use attainment status in the Furnace Run watershed based on data collected from 1984 to 2003. Attainment status for lotic habitats are based on biocriteria for the Erie/Ontario Lake Plain ecoregion of Ohio (OAC 3745-1-07, Table 7-17). River Mile values for the Metroparks Study have been adjusted to correspond with OEPA sites.

RIVER MILE	IBI	Qualitative Invertebrate Taxa (Total/EPT)	ICI	QHEI	Attainment Status	Comments
Furnace Run						
8.00 MSSC, 2003	46	42/6	32 ^{ns}	65.0	FULL	Between Townsend Rd. and restoration area
7.80 MSSC, 2003	52	38/5	26	62.25	PARTIAL	Within restoration area
7.30 MSSC, 2003	50	34/5	32 ^{ns}	87.5	FULL	Dst. Rock Creek confluence
6.50 MSSC, 2003	46	27/5	14 ¹	80.0	FULL ²	Dst. Brush Road
4.80 MSSC, 2003	44	20/8	- ³	73.5	FULL ⁴	Dst. SR 303
0.90 OEPA, 1996	48	42/10	E*	70.0	FULL	Ust. Everett Road covered bridge
0.90 OEPA, 1991	46	-	E*	73.0	FULL	"
0.90 OEPA, 1988	-	-	E*	-	FULL ⁵	"
0.20 OEPA, 1984	38	-	-	-	PARTIAL ⁶	Ust. confluence with Cuyahoga River
Rock Creek						
0.40 MSSC, 2003	30	34/5	18	75.5	NON	Ust. Elm Grove bridge in Brushwood area
0.40 OEPA, 1996	48	-	-	-	FULL	"

* Narrative evaluation used in lieu of ICI (E=Excellent, VG=Very Good, G=Good, MG=Marginally Good, F=Fair; P=Poor)

ns – nonsignificant departure from ecoregional biocriteria for WWH or EWH (<4 IBI or ICI units; <0.5 MIwb units).

¹ Hester-Dendy (HD) samplers partially buried by sediment

² Based on IBI score only due to partial burial of the HD samplers

³ HD samplers completely buried by sediment

⁴ Based on IBI score only due to burial of the HD samplers

⁵ Status based only on macroinvertebrate community

⁶ Status based only on fish community

4.0 2006 OEPA Survey Results

4.1 Water Chemistry

Water sample results indicated no exceedences of water quality standards for any analyzed parameter. All sample analyses for chromium, copper, zinc, mercury, cadmium, lead and selenium levels were below detection limits. Total phosphorus levels ranged from below detection limits (< 0.010 mg/l) to 0.061 mg/l. Ammonia levels were all below detection limits (< 0.050 mg/l).

No exceedences of water quality standards were found in the collected water samples. Biochemical Oxygen Demand (BOD) levels were below detection limits (< 2.0 mg/l) in all samples. Total Suspended Solids (TSS) levels were generally below detection limits (< 5.0 mg/l) in most samples, but ranged to 56 mg/l in one sample collected at the Everett Road site at RM 0.9. The elevated TSS level is attributed to rainfall for several days prior to the sampling event.

Elevated TDS and conductivity were found at the Rock Creek site, ranging up to 1420 mg/l and 2230 umho/cm respectively. Average TDS conductivity at the Rock Creek site was 1012 mg/l, which is below the Ohio EPA 1500 mg/l maximum standard Outside Mixing Zone Average (OMZA) for dissolved solids from point source discharges.

Field conductivity levels ranged from 468 – 2331 umhos/cm, with the highest levels found at the Rock Creek site. These corresponded to the laboratory analyses for this parameter. Total dissolved solids levels were generally below 600 mg/l but ranged from 272 to 1420 mg/l, again with the highest values found at the Rock Creek site. The elevated TDS and conductivity levels at the Rock Creek site are attributed to continuing slag leachate from the Ohio turnpike interchange construction upstream of this site.

4.2 Aquatic Life and Habitat

Fish and macroinvertebrate community (IBI, MIwb, ICI) and habitat (QHEI) values from this survey are presented in Table 2.

IBI scores ranged from 36 upstream of the Furnace Run confluence with the Cuyahoga River (RM 0.2) to 52 at RM 6.5. The IBI and MIwb scores at RM 0.2 were considered a nonsignificant departure from the ecoregional biocriteria for Warmwater Habitat (WWH). The last survey conducted in 1984 by OEPA at RM 0.2 found an IBI score of 38.

Table 2. Aquatic life use attainment status in the Furnace Run watershed based on data collected from May to October 2006.

RIVER MILE Fish/Invert.	IBI	Modified MIwb	ICI	QHEI	Attainment Status	Comments
Furnace Run						
8.00	49	NA	34	72.5	FULL	Between Townsend Rd. and restoration area
7.80	48	NA	40	74.5	FULL	Within restoration area
7.30	45	NA	44	80.5	FULL	Dst. Rock Creek confluence
6.50	52	NA	44	83.0	FULL	Dst. Brush Road
4.80	42	NA	Fair [*]	71.5	PARTIAL	Dst. SR 303
0.20 / 0.90	36 ^{ns}	7.8 ^{ns} (Wading)	Fair [*]	66.0	PARTIAL	Ust. Everett Road covered bridge to ust. Confluence with Cuyahoga River
Rock Creek						
0.30	49	NA	26 ^s	77.0	PARTIAL	Ust. Elm Grove bridge in Brushwood area

Ecoregion Biocriteria: Erie Ontario Lake Plain (EOLP) (Ohio Administrative Code 3745-1-07, Table 7-15)		
INDEX – Site Type	WWH	EWH
IBI – Headwaters	40	50
IBI – Wading	38	50
Mod. Iwb – Wading	7.9	9.4
ICI	34	46

* – Narrative evaluation used in lieu of ICI

^{ns} – nonsignificant departure from ecoregional biocriteria for WWH or EWH (<4 IBI or ICI units; <0.5 MIwb units).

^s – significant departure from ecoregional biocriteria – non attainment with WWH use designation.

Results of the macroinvertebrate quantitative samples from Furnace Run ranged from marginally good at the RM 8.0 site to very good at the RM's 7.3 and 6.5 sites (Table 3). Qualitative samples from RM's 4.8 and 0.9/0.2 were evaluated as fair. These two sites were the only ones with a calculated drainage area greater than 10 square miles. The Rock Creek quantitative sample from RM 0.3 was evaluated as fair. Sites evaluated as fair were not in attainment of the WWH use designation. The drainage area for each of the sites with quantitative sampling results was less than ten square miles. Sites with drainage areas less than ten square miles are usually evaluated by qualitative samples only, because there is usually insufficient water depth and current velocities for reliable use of the artificial substrate samplers. The reference data from which the ICI scoring criteria were developed did not include small drainage area sites, so caution should be used in evaluating ICI scores from the Furnace Run and Rock Creek sites. The qualitative samples, collected when the quantitative samples were collected, were all evaluated as fair except the Furnace Run RM 6.5 site which was marginally good.

Historical data are available from the Furnace Run RM 0.9 site for trend analysis. Table 4 summarizes macroinvertebrate qualitative sampling results from 1988, 1996 and 2006. There has been a consistent decline in number of total taxa, number of sensitive taxa, and number of EPT taxa collected in qualitative samples from 1988 to 2006. Bank erosion is severe in some locations and the stream channel appears to be unstable with its course changing radically during most storm events. These impacts associated with high flows during storm events appear to be negatively impacting Furnace Run macroinvertebrate communities.

Table 3. Summary of macroinvertebrate data collected from artificial substrates (quantitative sampling) and natural substrates (qualitative sampling) in Furnace Run and Rock Creek, 2006.

Stream/ River Mile	Density Number/ft ²	Total Taxa	Quantitative Taxa	Qualitative Taxa	Qualitative EPT ^a	ICI	Evaluation
Furnace Run							
8.0	219	47	38	18	6	34	Good ^b
7.8	366	44	32	28	7	40	Good ^b
7.3	308	47	36	21	8	44	Very Good ^b
6.5	211	55	42	32	11	44	Very Good ^b
4.8	--	--	--	19	7	--	Fair
0.9	--	--	--	20	8	--	Fair
Rock Creek							
0.3	77	44	32	29	6	26	Fair ^b

Ecoregion Biocriteria: Erie Ontario Lake Plain (EOLP) (Ohio Administrative Code 3745-1-07, Table 7-17)		
INDEX	WWH	EWH
ICI	34	46

^a EPT=total Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) taxa richness, a measure of pollution sensitive organisms.

* Significant departure from ecoregion biocriterion; poor and very poor results are underlined.

^{ns} Nonsignificant departure from biocriterion (≤ 4 ICI units).

^b Evaluation based on quantitative sample. Qualitative sample results are a narrative evaluation of fair for all sites except RM 6.5 which was marginally good.

Table 4. Furnace Run RM 0.9 historical data from macroinvertebrate qualitative sampling.

Year	Qualitative Taxa	Cold Water Taxa	Sensitive Taxa	Qualitative EPT ^a	Evaluation
1988	53	2	19	16	Exceptional
1996	42	2	12	10	Exceptional
2006	20	0	10	8	Fair

QHEI scores from all sites averaged 75, which is above the restoration or delisting target of 60 for the Loss of Fish Habitat Beneficial Use Impairment (BUI) for the Cuyahoga River AOC (Ohio EPA Delisting Targets for Areas of Concern, 2005). A review of QHEI components (Appendix 6) reveals an increase in Total Modified Warm Water Habitat (MWH) attributes as you move downstream. No MWH attributes were observed at the upstream sites (RM 8.0, 7.8); one to three attributes were observed at RMs 7.3, 6.5, 4.8 and 0.9; and six attributes were found at the mouth of Furnace Run (RM 0.2). This trend may be indicative of or associated with storm impacts and increased urbanization in upstream areas, resulting in elevated erosion rates at the mouth.

5.0 Conclusions and Recommendations

The results of the aquatic life and habitat evaluations indicate that this watershed is in PARTIAL attainment with Ohio water quality criteria for the Warm Water Habitat Use Designation (Table 2). Although the fish community in both Rock Creek and Furnace Run are meeting the IBI criteria, the macroinvertebrate community is showing signs of impairment, particularly in the qualitative samples. Use of these qualitative samples to determine degree of attainment may be a better methodology for evaluation of sites with a drainage area less than 10 square miles.

PARTIAL attainment in the Rock Creek tributary to Furnace Run is due to low ICI scores attributed to historical impacts from upstream pollution sources. However, the increase in IBI and ICI scores at this site from a 2003 survey which found the stream to be in NON attainment indicates that this small tributary is improving or adjusting to the impacts from the slag leachate discharge from upstream sources, although water chemistry results indicate that these impacts are not diminishing with time.

The stream restoration area in the Furnace Run mainstem (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 utilizing soil bioengineering techniques to improve riparian habitat. The 2003 survey conducted by Metroparks serving Summit County found this area to be in PARTIAL attainment with Ohio WQS 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.

The results of this survey indicate that the Furnace Run watershed meets the BUI Restoration Targets for Degradation of Fish Populations and Loss of Fish Habitat (Ohio EPA Delisting Targets for Areas of Concern, 2005). The aquatic macroinvertebrate data indicate that although the majority of the watershed meets the BUI restoration target for Degradation of Benthos, there appears to be continuing impact from slag leachate that affects Rock Creek.

Additionally, the physical habitat in Furnace Run sites at RM 6.5, 4.8, and 0.9 appeared to have been influenced by high flow events during 2006 and previous years. 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 (Photo 1 and 2). The stream bottom at RM 4.8 was covered with gray silts which clearly appeared to have eroded from the stream banks.



Photo 1. Eroding streambank at RM 6.5
D. Altfather



Photo 2. Silt covered stream bottom
D. Altfather

Sites near the mouth of Furnace Run (RM 0.2 and 0.9) were observed to have been recently impacted from heavy rains and high rates of erosion (Photo 3 and 4). This may have contributed to a drop in ICI scores at these sites over previous years (Table 4).



Photo 3. Furnace Run DST Everett Road.
Note heavy farm field erosion at far left.
K. Rogers



Photo 4. Mouth of Furnace Run. Note sediment plume into Cuyahoga River.
K. Rogers

The Furnace Run watershed should continue to be monitored on a regular basis to ensure that the restoration targets continue to be met and that the watershed remains in attainment with Ohio biological and water quality criteria. It is recommended that local political jurisdictions within the watershed implement riparian protection strategies and storm water management programs to maintain the current level of biological and water quality, as noted in the Lower Cuyahoga River Total Maximum Daily Loads (TMDL) Report (Ohio EPA, 2003). Communities within the Furnace Run watershed are also regulated under Ohio EPA Phase 2 Storm Water National Pollutant Discharge Elimination System System (NPDES) Permits which require the implementation and enforcement of these storm water management programs by early 2008.

References

Cuyahoga River Remedial Action Plan. 2004 Urbanization in the Cuyahoga Watershed, Guide #3.

Metroparks Serving Summit County. 2004 Natural Resource Management Study Furnace Run Metropark. Prepared by Enviroscience, Inc.

Ohio Environmental Protection Agency. 1999. Biological and Water Quality Study of the Cuyahoga River and Selected Tributaries. Available at:
www.epa.state.oh.us/dsw/documents/cuyvol1.pdf

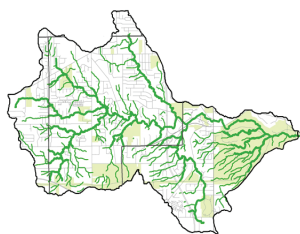
Ohio Environmental Protection Agency. 1994. Biological and Water Quality Study of the Cuyahoga River and Selected Tributaries. Ecological Assessment Section, Division of Surface Water.

Ohio Environmental Protection Agency. 2001. Manual of Laboratory Standard Operating Procedures: Volume I, II and III. Division of Environmental Services.

Ohio Environmental Protection Agency. 2003. Total Maximum Daily Loads for the Lower Cuyahoga River. Final Report. Division of Surface Water. Available at:
www.epa.state.oh.us/dsw/tmdl/LowerCuyahogaFinalTMDL.html

Ohio Environmental Protection Agency. June, 2005. Delisting Targets for Ohio Areas of Concern. Lake Erie Unit, Division of Surface Water. Available at:
http://www.epa.state.oh.us/dsw/rap/DelistingTargetsOhioAOC_Final_June20-2005.pdf

Ohio Environmental Protection Agency. 2006. Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices. Division of Surface Water and Environmental Services.



CUYAHOGA RIVER COMMUNITY PLANNING

1299 Superior Ave.
Cleveland, OH 44114
216.241.2414 x610
goodmanj@crcpo.org

Cuyahoga ReLEAF[®]

a project of the Cuyahoga River Community Planning Organization

In the shade of a thriving forest canopy: Streams are healthiest, water quality is highest, storm water is best managed, erosion and sediment are controlled, wildlife habitat is most diverse, fish populations are at their prime and aquatic life best spins the web of the food chain.

The health of a stream and watershed system correlates directly to the health of its forest canopy. Cuyahoga ReLEAF is a new initiative that addresses the continuing loss of forest cover in the Cuyahoga River watershed and northeast Ohio, and works toward woodland restoration for watershed health.

EDUCATION and OUTREACH

- GIS Mapping for a visual inventory of forest cover, showing canopy loss trends and at-risk areas
- Connecting the quality of forest canopy to the health of streams with educational materials and programs
- Training community decision makers in forest management and community development practices
- Integrating Forest Management into tributary watershed actions and community master plans
- Promoting the economic value of healthy forests to communities and property owners

PROTECTION

- Developing tributary-based management plans for restoring and protecting woodlands in the interest of watershed restoration and protection
- Analyzing and strengthening ordinances to protect trees and woodlands during construction
- Supporting protective policies for riparian areas around streams and wetlands
- Mitigating canopy loss within watersheds to manage impact on soil and streams
- Setting goals for sustainable forest canopy coverage

RESTORATION

- Planting native species and restoring diversification of species
- Partnering with Soil & Water Conservation Districts to develop riparian planting packages
- Developing opportunities for regional collaboration to create shared tree nurseries on underused land

Healthy riparian areas – the heavily vegetated areas surrounding rivers, tributary headwater streams and buffer areas around wetlands – provide the most support for water quality and aquatic life, but it is important that *all* lands in a watershed host healthy forest canopy.

We lose significant amounts of forest each year – from tall trees down to ground cover – due to pests, disease, construction and development. Exotic ornamental plantings replace diverse native species that would otherwise provide wildlife habitat. Monocultures of turf grass requiring irrigation and fertilization replace native ground cover that does not. Impervious paving replaces deep roots that would otherwise absorb storm water and hold soils in place.

Watersheds are systems. Forests are critical parts of green infrastructure that make those systems work. Protecting and restoring forests offers opportunities for regional partnerships, and allows communities to share the efforts and the benefits, just as they do in sharing stewardship of their watersheds.

Cuyahoga ReLEAF ~ protecting and restoring the forest canopy that keeps woods working for watersheds

The Cuyahoga River Community Planning Organization is the 501c3 nonprofit created to manage the Cuyahoga River Remedial Action Plan (RAP) to restore the Cuyahoga River. It is the lead partner in the Cuyahoga American Heritage River initiative, and operates CLEERTEC, an effort to connect environmental restoration with economic development. Learn more at www.crcpo.org.



• Presented in partnership with the Cuyahoga Soil & Water Conservation District and our tributary stewards
• "ReLEAF" used by permission of American Forests



Produced by the
Cuyahoga River Community Planning Organization

in cooperation with the
Furnace Run Watershed Partnership

copyright 2011 CRCPO