Big Creek
Watershed Plan
Balancing Growth and Watershed Stewardship

2010

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Acknowledgements

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

ABOUT THE BIG CREEK WATERSHED PLANNING PARTNERSHIP

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

ABOUT THE CUYAHOGA RIVER COMMUNITY PLANNING ORGANIZATION (CRCPO)

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

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Big Creek
Balanced Growth Initiative
2010

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

The goals of the Plan are to

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

Big Creek is one of the most urban watersheds in the Cuyahoga River basin. Restoration of natural infrastructure in strategic areas is an important tool to improve water flow and quality issues. Opportunities for preservation of natural systems are limited, but chances exist to replace and retrofit aging urban built structure with infill natural systems.

Building and strengthening stewardship in the river's tributaries is an important part of the Cuyahoga River Remedial Action Plan for delisting beneficial use impairments in the Cuyahoga. The Big Creek watershed is fortunate to have an active, energetic and effective stewardship group, Friends of Big Creek (FOBC), leading the charge for conservation and restoration. The Cuyahoga River Community Planning Organization has been working with FOBC and the communities whose land drains to Big Creek, as well as the Cleveland Metroparks.

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

Contents

This plan was prepared by the Cuyahoga River Community Planning Organization under award NA07NOS4190076 from the National Oceanic and Atmospheric Administration, U. S. Department of Commerce, through the Ohio Department of Natural Resources Office of Coastal Management.

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

Big Creek maps were produced by the Cuyahoga County Planning Commission.

Photographs by Friends of Big Creek.

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Big Creek
Balanced Growth Initiative
2010

PROJECT SCOPE

- Organize the Big Creek Watershed Planning Partnership representing communities, organizations, agencies and residents.
- Gather and analyze GIS data of critical natural watershed features
- Identify and evaluate community issues and desires
- Develop and agree on criteria and create a model for designating Priority Development / Redevelopment Areas (PDAs) and Priority Conservation Areas (PCAs)
- Identify undeveloped land for potential conservation / restoration sites in relation to natural features
- Designate Priority Conservation Areas & Priority Development Areas
- Identify ordinances, strategies and tools for stewardship
- Support adoption of the BGI Plan and implementation of strategies.

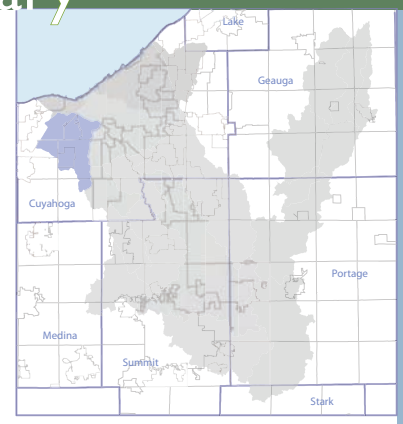
Executive Summary

Working with Friends of Big Creek, local government representatives and the Cuyahoga River Community Planning Organization created the Big Creek Watershed Planning Partnership to address shared concerns about the health of the Creek and the quality and quantity of water flowing throughout the watershed. The Partnership's tasks, outlined in the "Project Scope" at left, became focused on developing a Balanced Growth Plan to identify Priority Conservation Areas and Priority Development areas for land use planning, as well as a set of strategies for conservation and restoration of watershed functions.

The Partnership identified community issues and studied the critical features of the watershed, which led them to identify sites, strategies, policies and implementation steps. This plan presents the products of that process, and outlines specific sites for conservation, restoration and development.

With these tools, the Partnership, led and supported by the Friends of Big Creek, will take the next steps toward implementation, namely land acquisition or conservation, funding and restoration, retrofitting developed areas, and updating local ordinances. Thus, a heavily urbanized watershed can regain its health and become a more beneficial contributor to the Cuyahoga River and the Great Lakes.

Executive Summary
Big Creek



Big Creek is the northernmost, and one of the most urbanized, of the major tributaries to the Cuyahoga River. It joins the river approximately 7 miles south of the river's mouth at Lake Erie. The entire drainage area of Big Creek encompasses nearly 39 square miles, with a total stream length of 12.0 miles.

The creek travels through seven communities, including Cleveland, Brooklyn, Linndale, Parma, Parma Heights, Brook Park, and North Royalton.

Typical of many urban streams, Big Creek has been subject to the effects of extensive urbanization for more than 150 years. Its original drainage patterns, wetlands, floodplains and riparian areas have been severely altered and fragmented as a result of channelization, spillway structures, culverts, and land uses encroaching on the stream. This has substantially and permanently altered stream discharge rates and volumes, decreased diversity and livability of habitat and limited the recovery potential of the stream.

Water quality in Big Creek is degraded, limiting the usability of this stream for recreational purposes. Bacteria levels frequently exceed water quality standards. Ecological water quality conditions are typical of those within an urban area with fish habitat in the fair range, poor fish communities but improving and macroinvertebrate communities are also poor but improved from grossly polluted conditions of twenty years ago. The degraded water quality is a result of urban runoff, alteration and encroachment on the stream.

Big Creek is part of the Cuyahoga River Area of Concern, a designation reflecting its polluted nature. At the same time, this helps those who would improve the watershed to garner Federal and State commitments to cooperate with local entities to ensure that Remedial Action Plans are developed and implemented.

Approximately 1,570 acres (or 6%) of open space remains undeveloped. Many of these areas hold important watershed resources that are valuable examples of nature in the city and may offer opportunities for restoration.

The keys to improving Big Creek include properly conserving these natural resources as communities continue to develop and also restoring areas that have been impacted in the past.

MAJOR ISSUES IN THE BIG CREEK WATERSHED

- A large, urban watershed with high impervious coverage (39%) and one of the densest populations in the region.
- Watershed communities are susceptible to flooding, erosion and water quality effects.
- Need for improved stormwater management through retrofits and restoration.
- Remnant greenspaces or natural areas present opportunities for preservation / restoration; these areas have community value as examples of nature in the city.
- Integrating balanced growth recommendations into local community master plans and regulations.

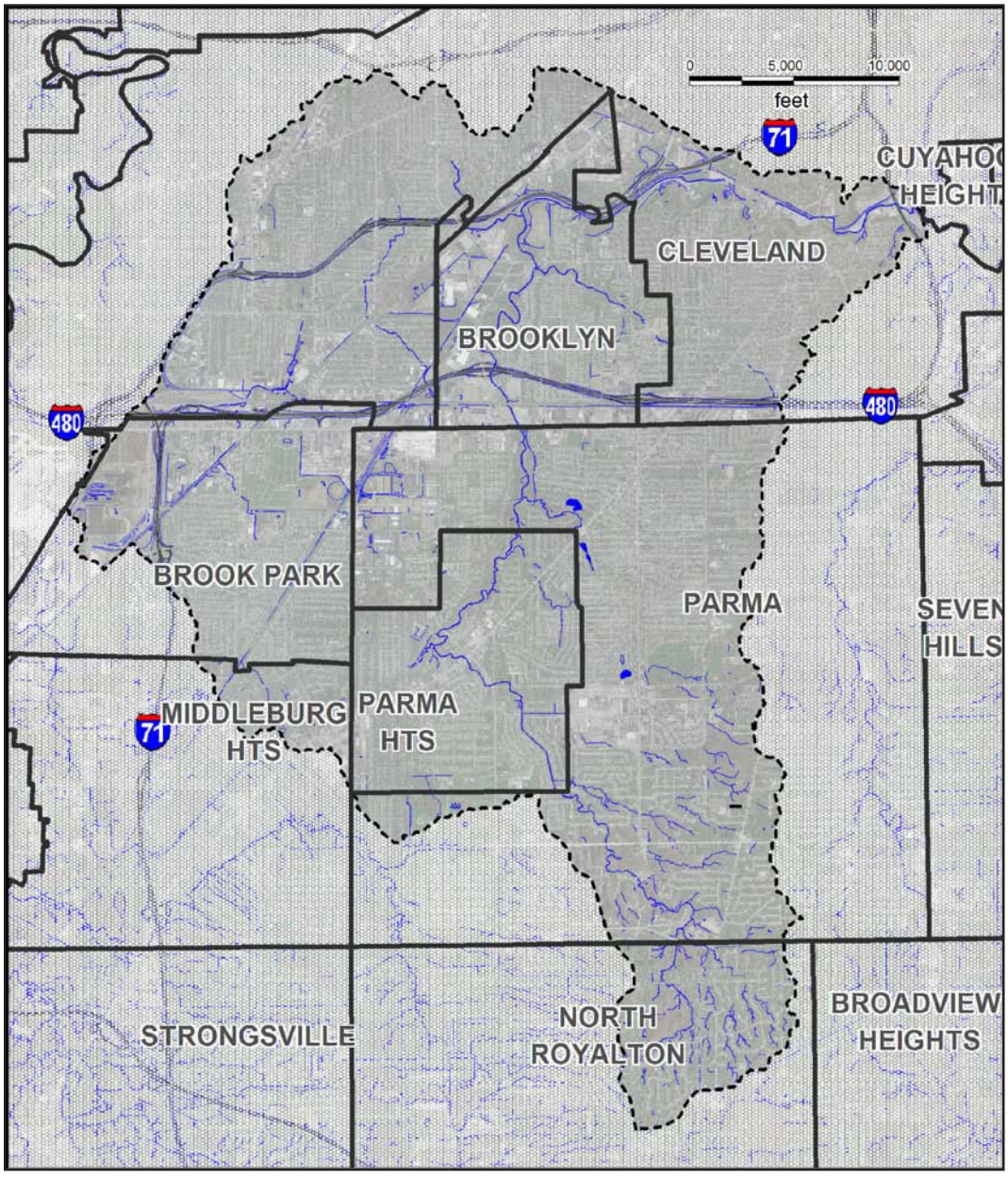
WATER QUALITY & BIOLOGICAL INTEGRITY

Big Creek is designated by Ohio EPA as a "Primary Contact" and "Warm Water Habitat" stream. These designations mean that Big Creek should have bacteria concentrations within a reasonable limit to allow safe recreational contact and be able to support a well-balanced population of fish and aquatic insects.

Water quality in Big Creek is degraded, limiting the usability of this stream for recreational purposes. Fecal bacteria levels frequently exceed water quality standards, indicating that sewage contamination is present.

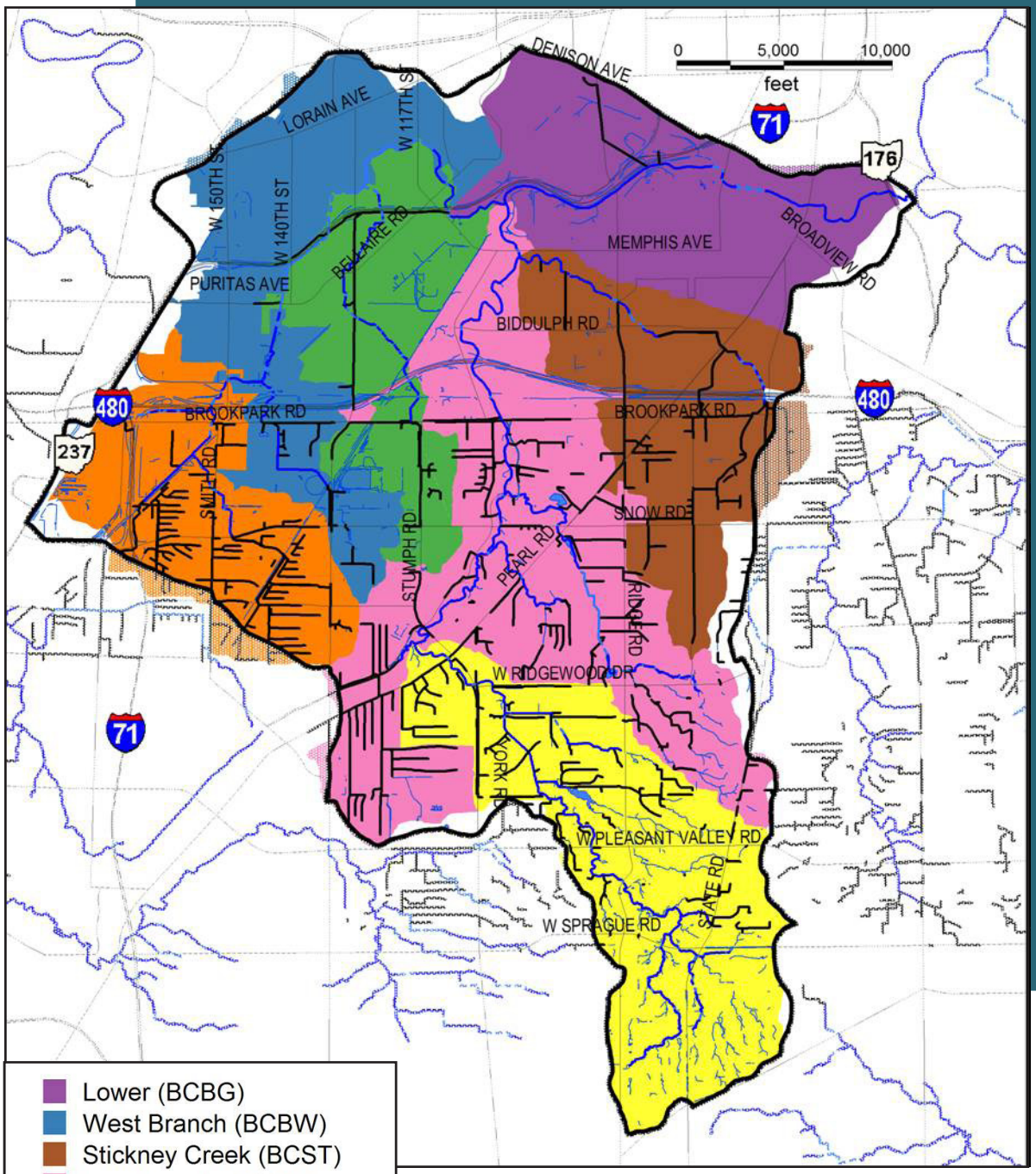
Biological conditions are typical of those within an urban area. Fish and aquatic insect communities are poor but improving from grossly polluted conditions of twenty years ago. The degraded biological community is a result of the presence of combined sewer overflows, sanitary sewer overflows, urban runoff and alteration of and encroachment on the stream.

Big Creek Municipalities



Municipal Composition of Big Creek Watershed

Brooklyn	11%	Linndale	0.2%
Brook Park	10%	North Royalton	5%
Cleveland	33%	Parma	29%
Parma Heights	11%		



Big Creek and its Subwatersheds

CRITICAL NATURAL FEATURES

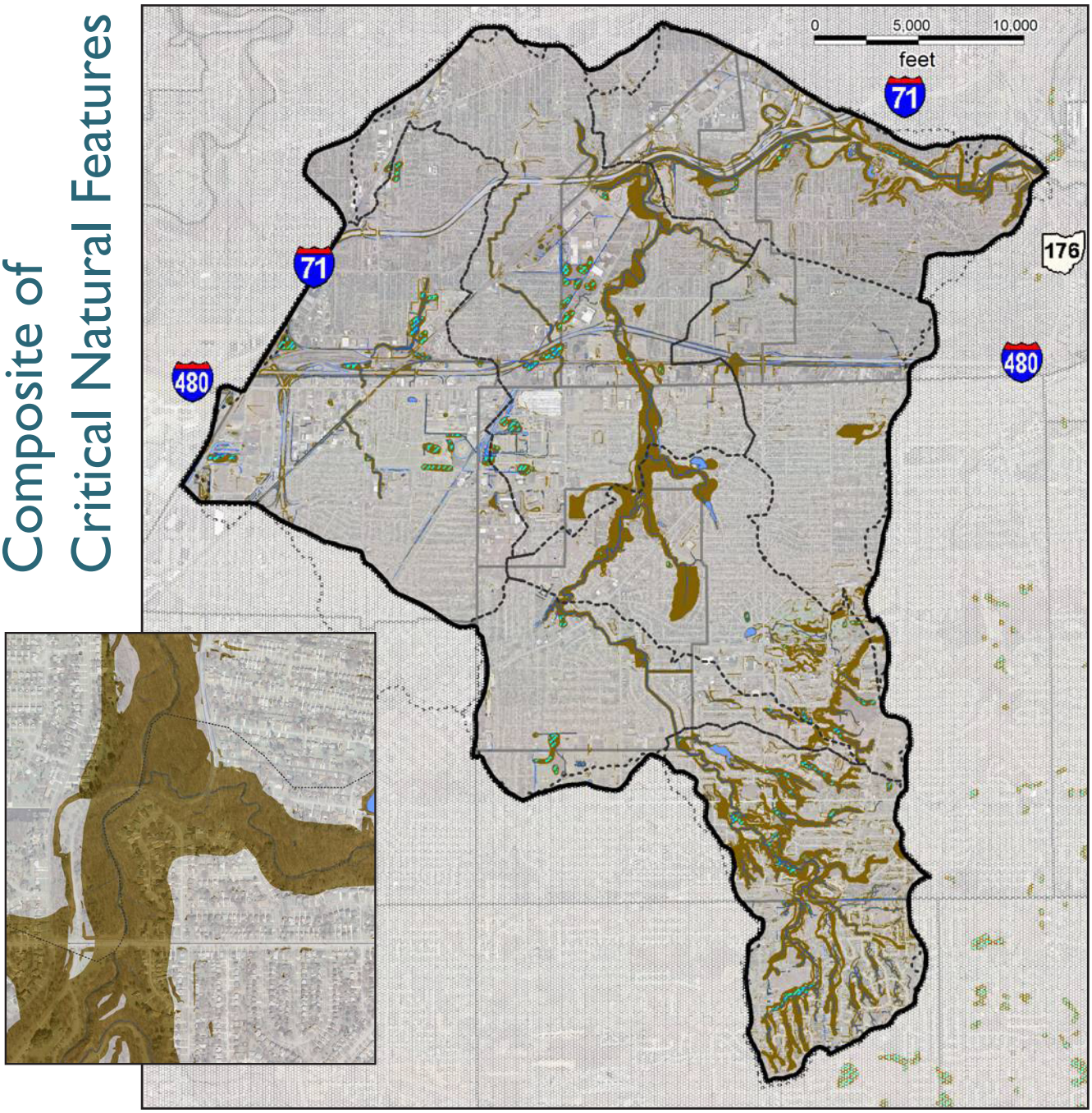
The natural features that are the focus of study when addressing how effectively the watershed functions include:

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

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

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

Composite of Critical Natural Features



METHODOLOGY

1. Identify and Evaluate Community Issues and Desires
2. Identify and remediate, where feasible, polllution issues.
   Early in the process of evaluating stream and watershed conditions, the Watershed Planning Partnership determined that due to the extreme urban condition of the watershed, coupled with the aged community infrastructure, the planning effort should embrace the techniques and tools of the new Balanced Growth Initiative watershed planning process as developed by the Ohio Lake Erie Commission. The plan development methodology followed OLEC BGI guidelines, including:
   A. GIS Data Analysis & Qualitative Assignment of Big Creek's Natural Features to Reflect Community Needs & Watershed Function
   B. Identify Undeveloped & Developed Land with Relation to Natural Features
3. Analyze Potential Priority Development / Redevelopment Areas
   - GIS Data Analysis of Priority Development / Redevelopment Areas
4. Identify Priority Conservation and Development / Redevelopment Areas
5. Analyze and Identify Priority Areas for Conservation Using Stormwater Retrofit Techniques
6. Review Community Ordinances and Identify Tools, Practices & Strategies for Community Stewardship

DEVELOPING EVALUATION CRITERIA
for Priority Conservation Areas and Priority Development Areas

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

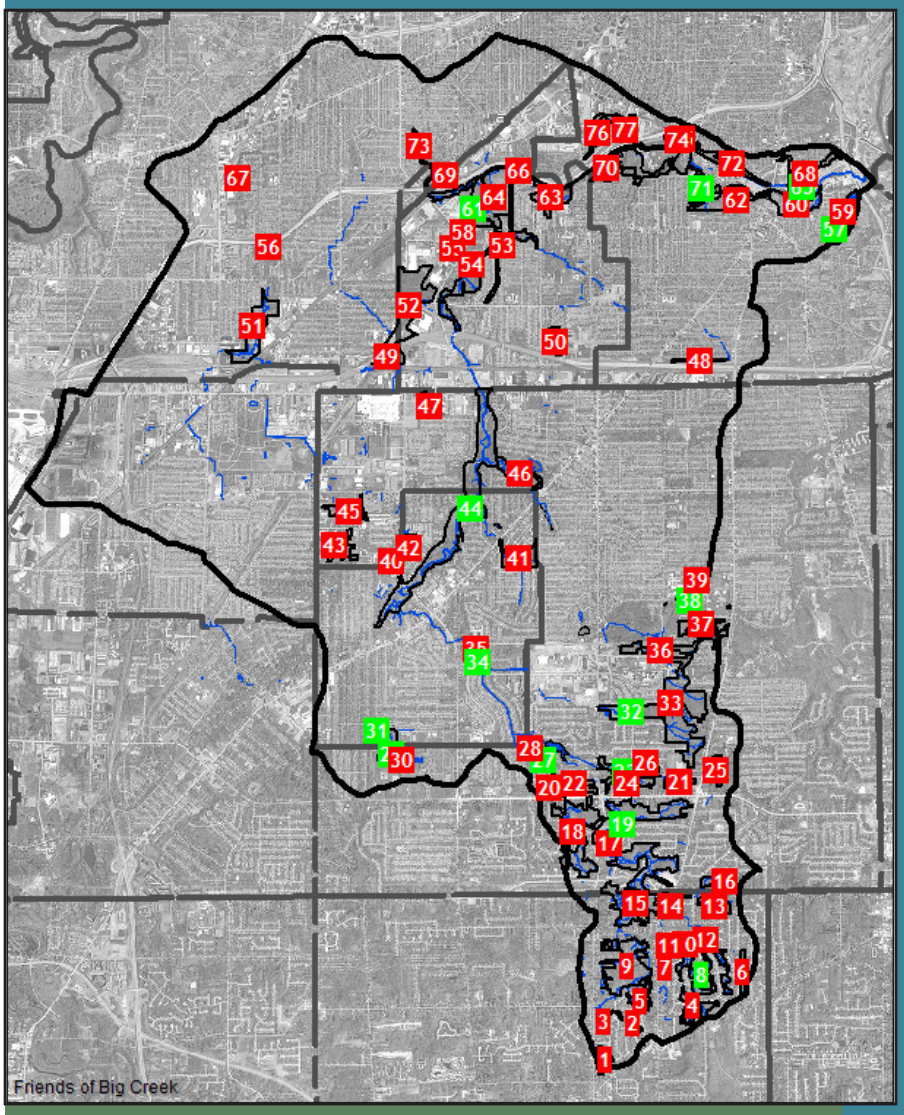
Numerous Watershed Planning Partnership meetings were held, and we solicited feedback from the partnership to help shape the evaluation criteria for identifying conservation and development areas. Each community representative received a scoring priority worksheet titled "Scoring Priorities for Conservation of Important Watershed Features". The worksheet listed watershed features and their associated function and each person was asked to rank the importance of each item.

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

GOALS of the Big Creek Watershed Balanced Growth Plan

COMMUNITY PRIORITIES for CONSERVATION	Results
Priorities for a Watershed Plan	%
Protect Stream features through Stream and Wetland Restoration	95%
Link Redevelopment with Natural Resource Protection	88%
Improve Water Quality in Big Creek	86%
Flood Hazard Reduction	85%
Improve Community Livability and Appeal	76%
Link Stream Valley to Neighborhoods w/ Green Trail Corridors	75%
Promote Economic cooperation for Community Development	71%

The next step in the analysis was to identify large areas of undeveloped land, helping to set the stage for identification of Priority Conservation Areas. The process also indicated future development pressures in relation to critical natural features.



The GIS land cover data and field investigations identified 1,570 acres in 63 tracts of undeveloped land, comprising 6.4% of the watershed, that are non-park-related and are therefore unprotected.

The characteristics of these 63 large undeveloped and unprotected tracts vary and include

- flat, heavily-forested upland areas that may have high development pressure;
- land adjacent to creek gorges, with steep terrain that could present difficulties for developers; and
- back lots of "bowling alley"-shaped parcels that could be consolidated

These parcels, shown in red on the map, hold considerable amounts of wetlands, streams, steep slopes and critical soils.

Parcels shown in green are park-owned lands and their proximity to critical features could mark them as valuable assets for land assembly for conservation.

Critical Features in Large Undeveloped Land Areas

	Total	Critical Soils	Steep Slopes	Flood Zones	Forest Cover	Wetlands & Streams
Total Unprotected Land in Large Tracts (acres)	1,570	814	486	not calculated*	297	914.7
Represents % of Features Remaining in Watershed	6.40%	7.70%	25%	not calculated*	71.90%	52.20%
* data unavailable, will incorporate when new data becomes available						

PCA

Priority Conservation Areas

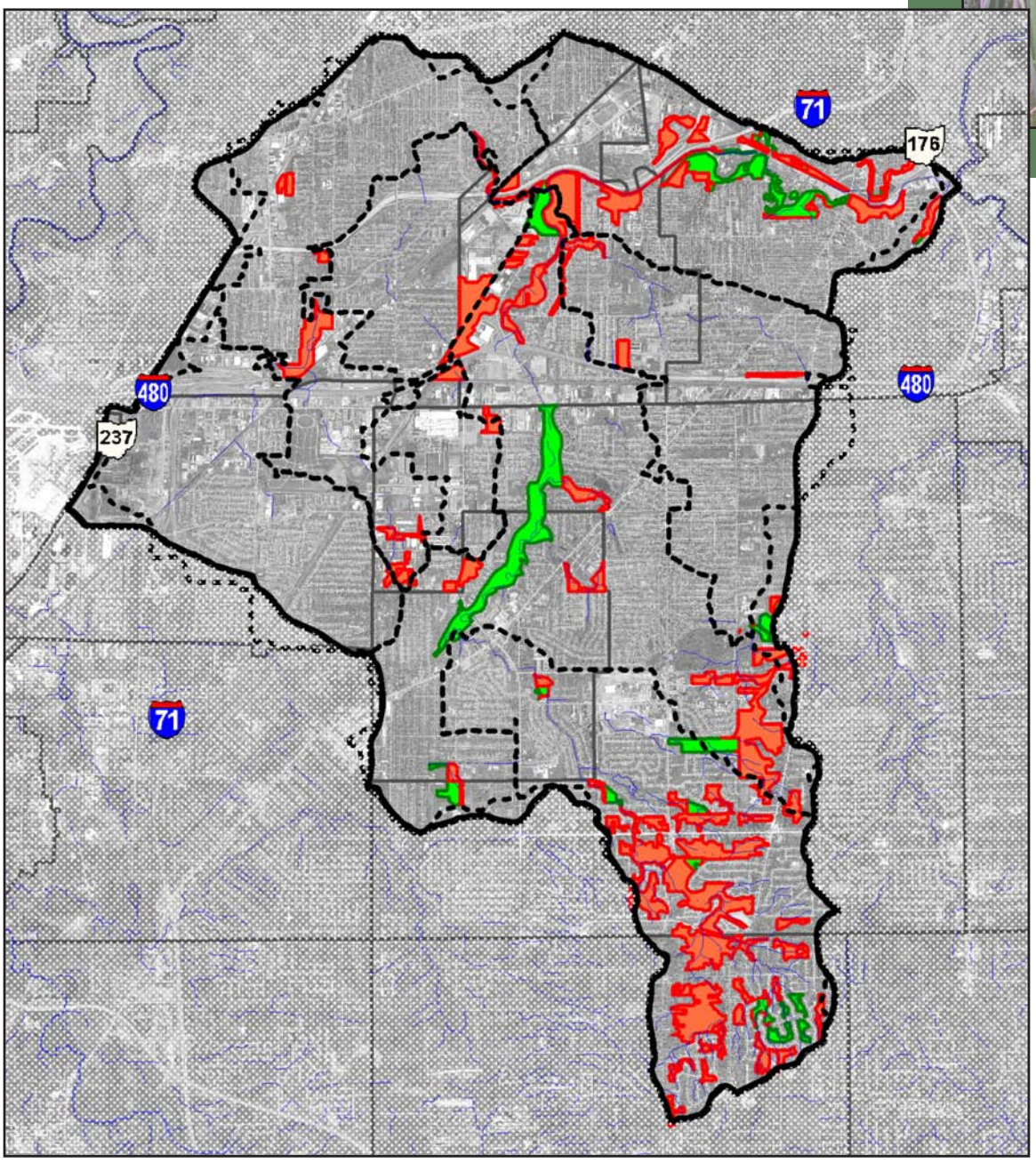
Priority conservation areas are locations where land use change is predicted to have a high impact on the watershed in terms of flooding, erosion, and water quality, based on the analysis of several data sets representing criteria that the watershed planning partners determined were important.

- CRITICAL SOILS
  Recommendation: In critical soil areas, communities should develop soil compaction limitations to help conserve this resource during construction. Conservation and low impact design standards are recommended.
- STEEP SLOPES
  Recommendation: In steep slope areas, communities should conserve these resources to the maximum extent possible for health, safety, property and environmental concerns. Setbacks should be implemented on slopes of 12% or more.
- STREAMS & NATURAL RIPARIAN AREAS
  Recommendation: Stream and riparian corridor areas should be protected from encroachment at all costs. Communities should adopt riparian setback ordinances to protect both headwater and primary headwater streams. Where impacts occur in these areas, mitigation within the immediate drainage area should be required .
- FLOODPLAINS
  Recommendation: Communities should conserve flood plains to accommodate excess flow, protect health and property. Community regulations need to maintain current flood plain maps and adequately protect floodplains from development to reduce future damages.
- WETLANDS
  Recommendation: Wetland areas should be conserved as essential storage and filtration systems. Communities should adopt ample setback ordinances for all wetlands categories.
- FORESTS
  Recommendation: Communities should conserve forested areas within riparian corridors and minimize the loss of existing forested areas throughout the entire watershed, through conservation development and tree preservation regulations.

PCA Analysis by Subwatersheds

Subwatershed	Total Large Tract Acres	Total Critical Watershed Features (Acres)	% of Watershed's Total Critical Features
East Branch (BCBE)	466.4	437.3	3.5%
Lower (BCBG)	288.9	222.1	1.8%
West Branch (BCBW)	122.2	98.0	0.8%
Colleda Branch (BCCD)	0.0	0.0	0.0%
Chevy Branch (BCCH)	28.3	34.6	0.3%
Stickney Creek (BCST)	41.3	22.6	0.2%
Upper Big Creek	623.8	614.1	4.9%
Total	**1570.9**	**1428.7**	**11.5%**

Priority Conservation Areas



Priority Conservation Areas

Protected Land

PDA

Priority Development Areas

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

The Big Creek watershed includes seven municipalities that are largely complete with zoning, water and sewer availability and other factors important for development.

- **HIGH DENSITY ZONING** lies within areas zoned for high density commercial, industrial or residential uses.

  The Plan relies on the community's underlying zoning to focus development and redevelopment in these areas. These areas typically followed business and industrial corridors and town centers. Directing development to these areas can bring businesses back to inner-ring suburbs where infrastructure currently exists.

- **HIGHWAY and MAJOR INTERCHANGES** lie within a 500-foot radius of a major intersection or half-mile radius of a highway interchange.

  Interchanges act as service centers that are important to commercial, industrial and residential development. They have high passenger volumes, multi-modal forms of transportation and are typically near town centers. Major intersections and highway interchanges were based on U.S. census classifications.

- **VACANT PARCELS** lie within undeveloped areas zoned for high density commercial, industrial and residential development.

  The location of vacant parcels can provide guidance in prioritizing future development. Directing redevelopment to these areas can bring businesses or mixed use residential growth back to cities where infrastructure currently exists, reducing urban sprawl.

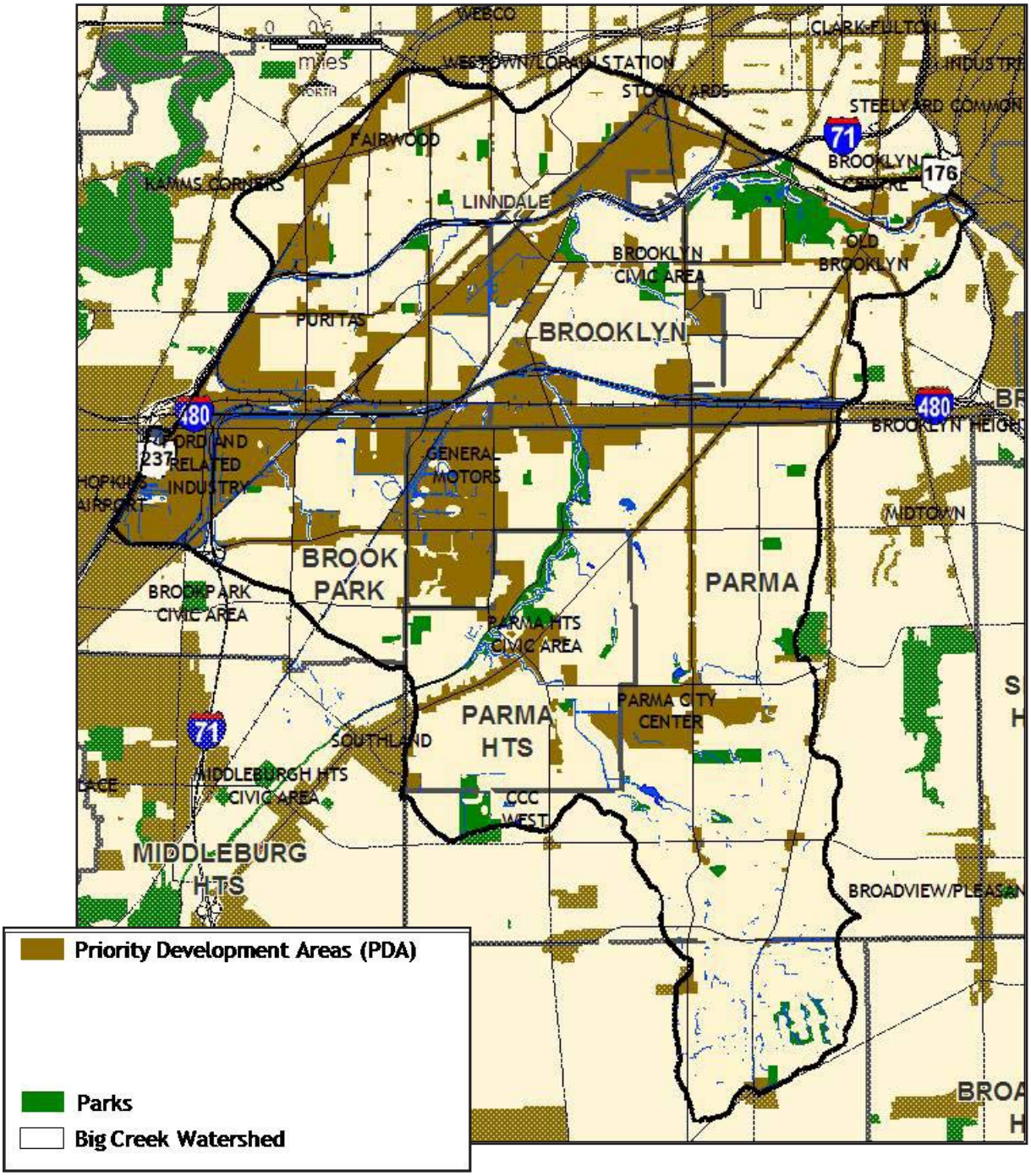
- **WITHOUT CRITICAL WATERSHED FEATURES** Priority Conservation Areas should be excluded from future development.

  Critical watershed features play an important role in managing stormwater. These features are already scarce and the remaining acreage should be protected for the benefit of the communities. Parks, restoration projects and greenway systems can be implemented in many of the areas.

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

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

Priority Development / Redevelopment Areas



PDA Analysis by Subwatersheds

The Colleda and West Branch have the largest acreage of Priority Development Areas each with over 1,000 acres. East Branch and the Lower Branch followed closely behind with 856 acres and 762 acres.

Analysis of high density land uses by city shows that the City of Cleveland holds the most acreage in this type of zoning (2,351 acres,) approximately double the acreage of Brook Park and Brooklyn (1,154 acres each.) Parma holds 1,522 acres of PDA-class zoning, while Parma Heights holds 349 acres and North Royalton only 32.7 acres.

	Net Area (Total Acres minus PCAs)					
Tributary	COMMERCIAL	INDUSTRIAL	MIXED	MULTI-FAMILY	Total PDA Acres (minus PCA)	% PDA Area Remaining
East Branch	464.0	356.9	-	35.5	856.4	89.6%
Lower	191.3	541.7	-	29.7	762.7	89.9%
West Branch	288.2	628.0	97.4	5.7	1,019.2	91.1%
Colleda Branch	177.8	611.4	348.1	27.7	1,165.0	99.8%
Chevy Branch	167.3	449.4	16.4	81.1	714.3	90.1%
Stickney Creek	314.6	190.2	-	5.7	510.5	94.3%
Upper Big Creek	330.3	-	-	81.5	411.8	98.9%
No Designated Tributary	43.4	129.0	0.1	11.7	184.2	97.7%
TOTAL	**1,977.1**	**2,906.5**	**462.0**	**278.6**	**5,624.2**	**93.3%**

Implementation Strategies - PCAs to Include Stormwater Retrofit Sites

In response to the "Goals of the Big Creek Watershed Plan," the group targeted "Improving water quality" and "Flood hazard reduction" as immediate and actionable objectives. They focused on a category of strategies that identified sites outside the roster of conventionally-defined PCAs that would be appropriate for restoration using stormwater retrofits – structural practices installed within the stream corridor or upland areas to capture and treat stormwater runoff before it is delivered to the stream. Considering the heavily urban nature of Big Creek, stormwater retrofits will be the primary restoration practice, since they can treat nonpoint source pollutants, minimize channel erosion and help restore stream hydrology.

Four specific types of sites and strategies were identified:

- **Large Parking Lots of 5 Acres or Larger** could receive infiltration-type best management practices (BMPs) at their outfalls, perimeters or interior areas;
- **Modifications to Existing Dry Basins** could add water treatment and storage areas;
- **New Storage Below Outfalls** could divert and manage flows split from existing drainage systems, sending waters to treatment areas on public land in the stream corridor; and
- **Storage at Highway Interchanges** could hold large amounts of runoff in depressions within rights-of-way, clover-leafs, medians and entrance/exit circles.

In Conclusion:

Continuing leadership on the part of the Friends of Big Creek, and collaboration by the communities of Big Creek, the Watershed Planning Partnership and the Cuyahoga River RAP will be essential for ongoing improvement and stewardship within the watershed.

Recommendations

Short Term

- Support the Friends of Big Creek.

  This Plan will be implemented by the FOBC and the local communities.
  This planning process identified policies, tools and strategies, which must be carried forward by the watershed partnership. Communities and partners must, in turn, commit to continue to support the Friends in this mission.

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

  The participating jurisdictions should agree to a Resolution which outlines the relationship and obligations of the jurisdictions within the Big Creek BGI Watershed Plan. This step is crucial in order to receive state endorsement and future financial incentives.

- Submit BGI Plan to the State for approval.

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

Friends of Big Creek will serve as Plan Implementation Coordinator - working closely with the local governments of the watershed on action steps, funding, and a timetable to achieve implementation of the stated plan goals and action elements.

FOBC will convene meetings as necessary and continue to be the communications hub for stewardship activities in the watershed, as it has for many years.

Long Term

- **Incorporate the PCA / PDA map into local master plans and zoning maps.** Each jurisdiction should submit and adopt the PCA/PDA Map to elected officials and approving bodies for review and approval. Each jurisdiction should follow its established public review processes for plan adoption.
- **Update local ordinances and zoning codes as recommended in the plan.** Each jurisdiction should update land use policies and documents, including comprehensive plans, zoning and subdivision regulations, to ensure consistency with the BGI Plan.
  Jurisdictions should work together on this task.
- **Create uniform storm water codes throughout the watershed** to ensure that watershed protection and site development review processes are fair, consistent and apply evenly to all areas of the watershed as development and plan implementation moves forward.
- **Implement conservation, restoration and retrofit programs** at sites that have been identified, as well as the top ten wetland project sites identified in Big Creek through the RAP's prioritization study. Use this information to capture funding and assemble willing land owners and project partners. Identifying these sites allows projects to be expedited to meet mitigation needs and attract public and private funds.
- **Explore developing a Transfer of Development Rights / Purchase of Development Rights / Density Transfer Program** as a long term goal.

  Development Rights Programs should be considered as part of the tool kit of options to achieve conservation and direct development away from sensitive areas.
- **Revise and update plan when needed.** As different projects or watershed needs become apparent, additional chapters should be added to the BGI Plan.