

THE WATER QUALITY PROBLEM STATEMENT FOR THE ROCKY RIVER WATERSHED

**Rocky River Semi-Annual Report
Appendix G
May 2006
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The Water Quality Problem Statement for the Rocky River Watershed

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The Water Quality Problem Statement for the Rocky River Watershed

Abstract

This report summarizes the water quality problems that have been documented to affect the Rocky River Watershed of Northeast Ohio. It includes a discussion of fourteen individual stream segments in the watershed. This report is one of a series of analyses prepared for the Rocky River Watershed Action Plan through and Ohio 319 Grant 01(h) EPA-09.

The Water Quality Problem Statement for the Rocky River Watershed

Introduction

The following presentation provides a statement of the water quality problems that have been documented in the Rocky River and its tributaries. This statement is the result of a process that was undertaken by the Rocky River Watershed Council and its Work Groups. The Water Quality Problem Statement was preceded by a series of reports that collected, analyzed, and evaluated the information known about water quality in the Rocky River Watershed. These reports include:

1. "Water Resource of the Rocky River".
2. "Watershed Inventory for the Rocky River Watershed".
3. "Inventory of Point and Nonpoint Source Discharges in the Rocky River Watershed".
4. "A Look at the Beneficial Use Impairments of the Rocky River".
5. "A Guide to the Causes and Sources of Water Quality Problems in the Rocky River Watershed Report".
6. "Target Load Reduction for the Rocky River Watershed Report".
7. "Water Resource Threats Related to Growth in the Rocky River Watershed".
8. "Summary Report of Source Identification Surveys".

The presentation that follows contains a series of items for each of the major segments of the Rocky River. The presentation begins with a summary of the key information that describes the segment. For each segment, maps are then provided that identify the Use Attainment Assessment generated by Ohio EPA. These maps also depict the geographic extent of the major causes or sources that impact any given stream segment. The Problem Statement for each segment summarizes the beneficial use assessment that was made for the segment, the point and nonpoint sources of concern, the nature of existing water quality problems in the segment, and the result of Ohio EPA's Total Maximum Daily Load Evaluation. The segment report concludes with a statement of the problem-solving strategies that apply to the problems identified as important in that segment. These strategies quantify needed load reductions whenever possible.

Water Quality Problems in the Mainstem of the Rocky River

Stream: Rocky River Mainstem

Tributary to: Lake Erie

Drainage Area: 293.8 square miles total

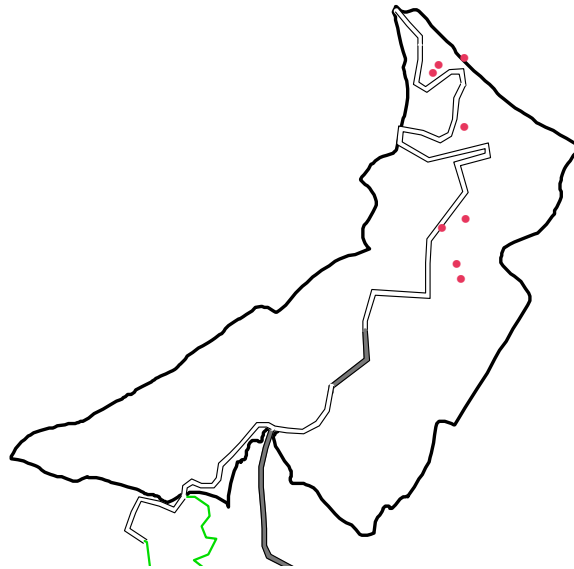
Length: 11.8 miles, 48.0 miles including the East Branch Slope: 13.7 feet per mile

Ohio EPA Use Designations: State Resource Water; Warm Water Habitat; Agricultural and Industrial Water Supply; Primary Contact Recreation

Aquatic Life Use Attainment Status: 0.0 miles in Full Attainment, 8.7 miles in Partial Attainment, and 3.37 miles in Nonattainment

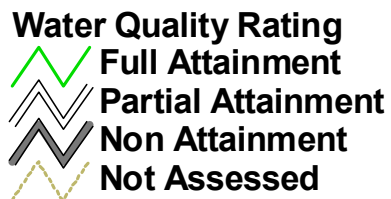
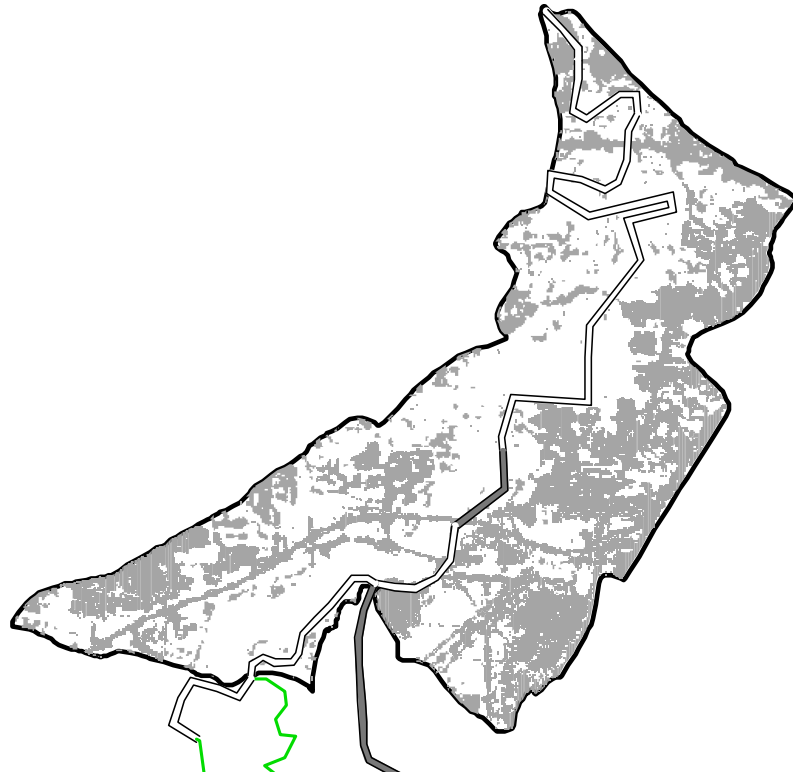
Recreational Use Assessment: Impaired

CSO Locations in the Mainstem of the Rocky River



- Combined Sewer Outfall Locations
- Water Quality Rating
- Full Attainment
- Partial Attainment
- Non Attainment
- Not Assessed

Urbanized Lands in the Mainstem of the Rocky River



Problem Statement for the Mainstem of the Rocky River

Water Resource Use Impairments	Point/Nonpoint Sources Present	Water Quality Problem Causes	TMDL Causes of Concern
<p>Fish and other wildlife should taste good. Slightly Impaired</p> <p>Fish should be free of abnormal tumors and other deformities. Not Impaired</p> <p>Fish and other wildlife populations should be diverse and healthy. Impaired</p> <p>Macroinvertebrate community populations should be diverse and healthy. Not Impaired</p> <p>There should be a lack of eutrophication or undesirable algae. Not Impaired</p> <p>The river should be free of drinking water consumption or taste and odor problems. Not Impaired</p> <p>The river should be safe for swimming and wading. Impaired</p>	<p>Point Sources</p> <ul style="list-style-type: none"> • Impacted • Minor • Threatened <p>Combined sewer overflows or sanitary sewer outfalls.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened <p>Agricultural Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened • Not an issue <p>Urban Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened <p>Home Sewage Treatment System Discharges.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor <p>Wildlife wastes.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened 	<p>Nitrogen Loadings.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Habitat Modifications.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Bacteria and Pathogens.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Toxic Chemicals</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened 	<p>Nitrogen Loadings.</p> <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <p>Habitat Modifications.</p> <p>Bacteria and Pathogens.</p> <p>Toxic Chemicals</p>
<p>The river should be aesthetically pleasing. Locally Impaired</p> <p>The amount and quality of sediment in the river should keep dredging activities within normal limits. Not Impaired</p> <p>There should be no added costs to agriculture Not Impaired</p> <p>Microscopic plants and animal populations should be healthy and diverse. Unknown</p> <p>Fish and wildlife habitat should be diverse. Impaired</p>	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: auto;"> <p>Bold Type indicates selection that applies to this river segment</p> </div>		

Problem Solving Strategies for the Mainstem of the Rocky River

Storm Water Management

Begin the process of recovering urban impacted streams and their aquatic habitat:

- Reduce effective imperviousness of subbasin from 39.45% to 15%.
- Evaluate low head dams along Mainstem and remove those that serve as obstructions to aquatic migration.
- Reduce modified habitat attributes associated with heavy sediment loads and scouring stream flows from urban runoff wherever possible.
 - Reduce sediment loading from bank erosion by stabilizing 500 linear feet of streambank and adding riffles/grade control and/or bankfull benches along 2500 feet of an unnamed tributary to the Mainstem adjacent to Windsor Drive in North Olmsted to reduce nitrogen loading by 100 lbs/yr, phosphorus loading by 45 lbs/yr and sediment loading by 75 tons/yr, at a cost of \$300,000.
 - Target residential neighborhoods upstream of the erosion sites along Windsor Drive in North Olmsted for rain garden, rain barrel, downspout disconnection, and roadside ditch retrofit outreach and deployment, with an initial goal of treating 25% of the channel protection volume (25% = 1 acre-ft or 163 cubic ft/acre).

Minimize the storm water impacts associated with new development:

- Manage the limited amount of new development likely in the subbasin and the pronounced development pressure in the upper watershed.
- Maintain high degree of riparian vegetation along stream channel.

Reduce urban runoff rates and pollutant loadings:

- Nitrogen loadings need to be reduced by 46% and phosphorus loadings by 28% to meet TMDL objectives.
- Combined sewer outfall improvements that are programmed to reduce overflows by 88% from the Lakewood system and 25% from the NEORS system need to be completed.
- Human and animal bacteria loadings associated with storm water need to be reduced wherever possible.

Home Sewage Treatment System Improvements

No established problems exist from this source in the Mainstem's direct watershed.

Agricultural Runoff

No established problems exist from this source in the Mainstem's direct watershed.

Land Use Issues

Continuing education of golf course personnel is called for to insure minimal impact from maintenance practices.

Water Quality Problems in Abram Creek

Stream: Abram Creek

Tributary to: Mainstem of the Rocky River

Drainage Area: 10.06 square miles Length: 7.4 miles Slope: 29.4 feet per mile

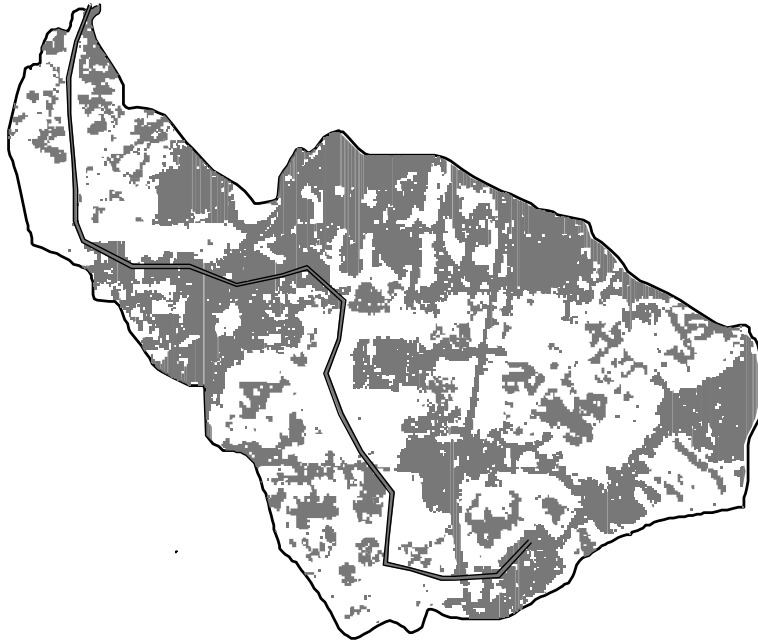
Ohio EPA Use Designations: Water; Warm Water Habitat; Agricultural and Industrial Water Supply; Primary Contact Recreation

Aquatic Life Use Attainment Status: 0.0 miles in Full Attainment, 0.0 miles in Partial Attainment, and 3.7 miles in Nonattainment

Wetland Locations in the Abram Creek Watershed



Urbanized Lands in the Abram Creek Watershed



Use Attainment Status
Non Attainment

Problem Statement for Abram Creek

Water Resource Use Impairments	Point/Nonpoint Sources Present	Water Quality Problem Causes	TMDL Causes of Concern
<p>Fish and other wildlife should taste good. Slightly Impaired</p> <p>Fish should be free of abnormal tumors and other deformities. Not Impaired</p> <p>Fish and other wildlife populations should be diverse and healthy. Impaired</p> <p>Macroinvertebrate community populations should be diverse and healthy. Impaired</p> <p>There should be a lack of eutrophication or undesirable algae. Not Impaired</p> <p>The river should be free of drinking water consumption or taste and odor problems. Not Impaired</p> <p>The river should be safe for swimming and wading. Impaired</p> <p>The river should be aesthetically pleasing. Locally Impaired</p> <p>The amount and quality of sediment in the river should keep dredging activities within normal limits. Not Impaired</p> <p>There should be no added costs to agriculture Not Impaired</p> <p>Microscopic plants and animal populations should be healthy and diverse. Unknown</p> <p>Fish and wildlife habitat should be diverse. Impaired</p>	<p>Point Sources</p> <ul style="list-style-type: none"> • Impacted • Minor • Threatened <p>Combined sewer overflows or sanitary sewer outfalls.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened <p>Agricultural Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened • Not an issue <p>Urban Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened <p>Home Sewage Treatment System Discharges.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor <p>Wildlife wastes.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened 	<p>Nitrogen Loadings.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Habitat Modifications.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Bacteria and Pathogens.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Toxic Chemicals</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened 	<p>Nitrogen Loadings.</p> <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <p>Habitat Modifications.</p> <p>Bacteria and Pathogens.</p> <p>Toxic Chemicals</p>

Problem Solving Strategies for Abram Creek

Storm Water Management

Begin the process of recovering urban impacted streams and their aquatic habitat:

- Reduce effective imperviousness of subbasin from 45.29% to 15%.
- Evaluate high dams upstream of Cedar Point Road and remove if demonstrated to be an obstruction to aquatic migration.
- Reduce modified habitat attributes and habitat degradation associated with urban runoff wherever possible.

Minimize the storm water impacts associated with new development:

- Manage the limited amount of new development likely in the subbasin.
- Maintain high degree of riparian vegetation along stream channel.
- Prioritize parcels for permanent protection via fee simple acquisition or the acquisition of conservation easements.

Reduce urban runoff rates and pollutant loadings:

- Ammonia loading reductions from Cleveland Hopkins International Airport need to be completed.
- Glycol discharges from the airport also need to be eliminated.
- Human and animal bacteria loadings associated with storm water need to be reduced wherever possible.
- Install storm water retrofit practices in appropriate locations to add both water quality treatment and storage capacity, with an initial goal of treating 200 acres of the subwatershed, reducing nitrogen loading by 500 lbs/yr and phosphorus loading by 64 lbs/yr, at an estimated cost of \$2 million. See attachment A for a map of potential locations.
- Target residential neighborhoods in the uppermost 750-acre catchment along Big Creek Parkway in Middleburg Heights for rain garden, rain barrel and fertilizer management outreach and deployment to reduce runoff volume by 400,000 gallons/yr, nitrogen loading by 10 lbs/yr and phosphorus loading by 4 lbs/yr.

Home Sewage Treatment System Improvements

200 HSTSs exist in the watershed; at least 50 need to be upgraded.

Agricultural Runoff

No established problems exist from this source in the Abram Creek watershed.

Land Use Issues

No specific issues are a priority in this watershed.

Water Quality Problems in the East Branch of the Rocky River

Stream: East Branch of the Rocky River

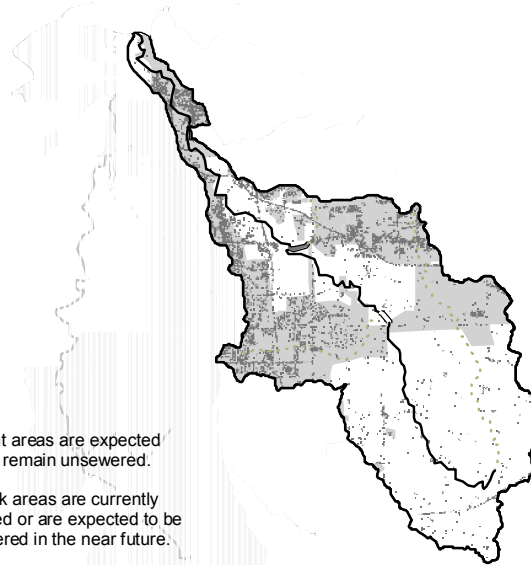
Tributary to: Mainstem of the Rocky River

Drainage Area: 80.4 square miles Length: 34.5 miles Slope: 16.5 feet per mile





Ohio EPA Use Designations: State Resource Water; Warm Water Habitat; Agricultural and Industrial Water Supply; Primary Contact Recreation

Aquatic Life Use Attainment Status: 25.1 miles in Full Attainment, 4.9 miles in Partial Attainment, and 0.0 miles in Nonattainment

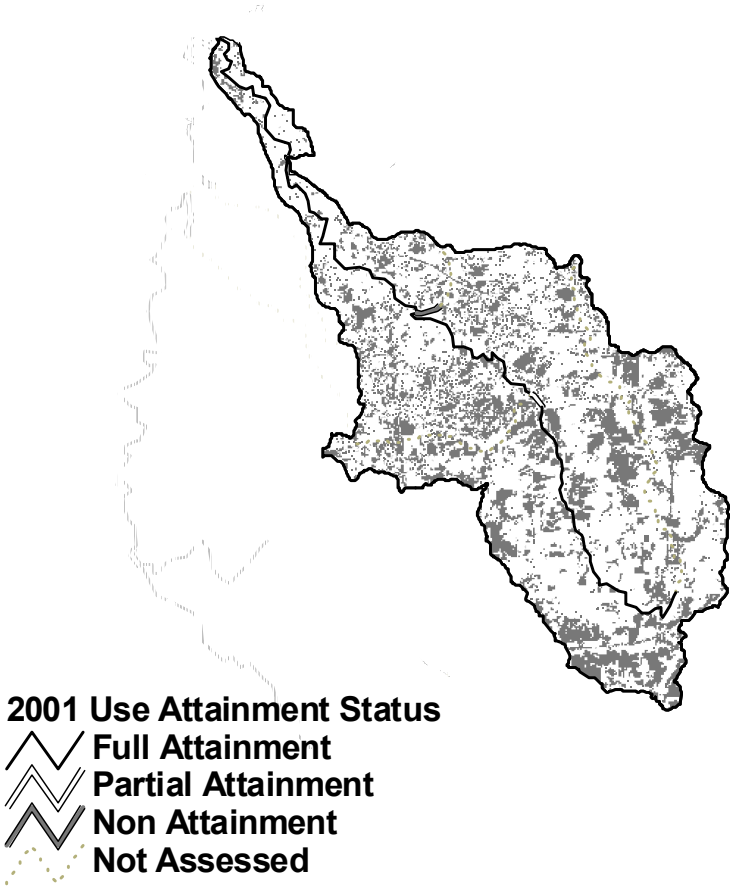
Urbanized Lands in the East Branch of the Rocky River



2001 Use Attainment Status

-  Full Attainment
-  Partial Attainment
-  Non Attainment
-  Not Assessed

Agricultural Lands in the East Branch of the Rocky River



Problem Statement for the East Branch of the Rocky River

Water Resource Use Impairments	Point/Nonpoint Sources Present	Water Quality Problem Causes	TMDL Causes of Concern
<p>Fish and other wildlife should taste good. Not Impaired</p> <p>Fish should be free of abnormal tumors and other deformities. Not Impaired</p> <p>Fish and other wildlife populations should be diverse and healthy. Impaired</p> <p>Macroinvertebrate community populations should be diverse and healthy. Not Impaired</p> <p>There should be a lack of eutrophication or undesirable algae. Not Impaired</p> <p>The river should be free of drinking water consumption or taste and odor problems. Not Impaired</p> <p>The river should be safe for swimming and wading. Impaired</p> <p>The river should be aesthetically pleasing. Locally Impaired</p> <p>The amount and quality of sediment in the river should keep dredging activities within normal limits. Not Impaired</p> <p>There should be no added costs to agriculture Not Impaired</p> <p>Microscopic plants and animal populations should be healthy and diverse. Unknown</p> <p>Fish and wildlife habitat should be diverse. Threatened</p>	<p>Point Sources</p> <ul style="list-style-type: none"> • Impacted • Minor • Threatened <p>Combined sewer overflows or sanitary sewer outfalls.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened <p>Agricultural Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened • Not an issue <p>Urban Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened <p>Home Sewage Treatment System Discharges.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor <p>Wildlife wastes.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened 	<p>Nitrogen Loadings.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Habitat Modifications.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Bacteria and Pathogens.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Toxic Chemicals</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened 	<p>Nitrogen Loadings. Organic Enrichment/ Dissolved Oxygen Problems. Habitat Modifications. Bacteria and Pathogens. Toxic Chemicals</p> <p>None of the above</p>

Problem Solving Strategies for the East Branch of the Rocky River

Storm Water Management

Begin the process of recovering urban impacted streams and their aquatic habitat:

- Reduce effective imperviousness of lower portions of the East Branch to 15%.
- Reduce modified habitat attributes and habitat degradation associated with urban runoff wherever possible.

Minimize the storm water impacts associated with new development:

- Manage new development likely in the Strongsville, North Royalton, and Hinckley Township portions of the subbasin.
- Manage new development likely in the Richfield and Richfield Township portions of the subbasin.
- Maintain high degree of riparian vegetation along stream channel.

Reduce urban runoff rates and pollutant loadings:

- Human and animal bacteria loadings associated with storm water need to be reduced wherever possible.

Home Sewage Treatment System Improvements

1,683 HSTSs exist in the watershed; at least 640 need to be upgraded.

Agricultural Runoff

Improperly managed horse, cattle, and other farm animal wastes produce excessive nutrient and bacteria loadings that contribute marginally to documented problems in downstream areas

- Minimize localized problems that exist from livestock operations in the upper East Branch watershed in Medina County. Target remediation resources to horse operations discharging to the East Branch in North Royalton and Berea and to the West Branch in Olmsted Township.

Minimize nutrient, fertilizer, and chemical runoff from crop production.

- Target cost-share resources to farms located in the Upper East Branch Watershed.

Land Use Issues

Conservation and other low impact developments need to be encouraged throughout the watershed.

Water Quality Problems in Baldwin Creek

Stream: Baldwin Creek

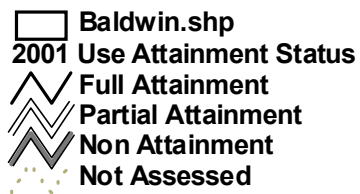
Tributary to: East Branch of the Rocky River

Drainage Area: 11.94 square miles Total Length: 9.2 miles Slope: 53.8 feet per mile

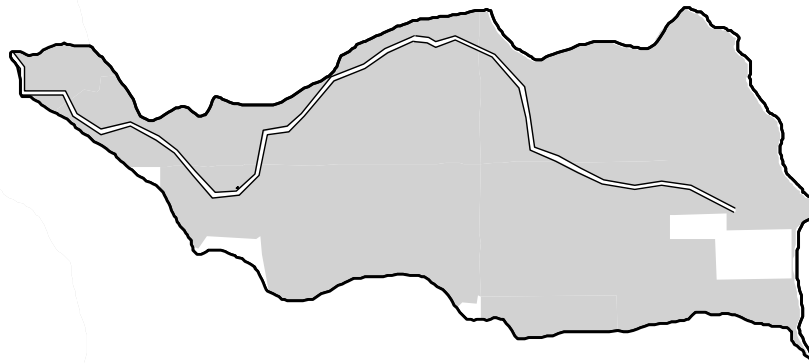
Ohio EPA Use Designations: State Resource Water; Warm Water Habitat; Agricultural and Industrial Water Supply; Primary Contact Recreation

Aquatic Life Use Attainment Status: 0.0 miles in Full Attainment, 8.0 miles in Partial Attainment, and 0.0 miles in Nonattainment

Urbanized Lands in Baldwin Creek



Status of Sanitary Sewer Service in Balwin Creek



Dark Areas are currently served with sanitary sewer service.

Light areas will continue to utilize HSTs.

Problem Statement for Baldwin Creek

Water Resource Use Impairments	Point/Nonpoint Sources Present	Water Quality Problem Causes	TMDL Causes of Concern
<p>Fish and other wildlife should taste good. Not Impaired</p> <p>Fish should be free of abnormal tumors and other deformities. Not Impaired</p> <p>Fish and other wildlife populations should be diverse and healthy. Impaired</p> <p>Macroinvertebrate community populations should be diverse and healthy. Impaired</p> <p>There should be a lack of eutrophication or undesirable algae. Not Impaired</p> <p>The river should be free of drinking water consumption or taste and odor problems. Not Impaired</p> <p>The river should be safe for swimming and wading. Impaired</p> <p>The river should be aesthetically pleasing. Locally Impaired</p> <p>The amount and quality of sediment in the river should keep dredging activities within normal limits. Not Impaired</p> <p>There should be no added costs to agriculture Not Impaired</p> <p>Microscopic plants and animal populations should be healthy and diverse. Unknown</p> <p>Fish and wildlife habitat should be diverse. Impaired</p>	<p>Point Sources</p> <ul style="list-style-type: none"> • Impacted • Minor • Threatened <p>Combined sewer overflows or sanitary sewer outfalls.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened <p>Agricultural Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened • Not an issue <p>Urban Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened <p>Home Sewage Treatment System Discharges.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor <p>Wildlife wastes.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened 	<p>Nitrogen Loadings.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Habitat Modifications.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Bacteria and Pathogens.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Toxic Chemicals</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened 	<p>Nitrogen Loadings.</p> <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <p>Habitat Modifications.</p> <p>Bacteria and Pathogens.</p> <p>Toxic Chemicals</p> <p>None of the above</p>

Problem Solving Strategies for Baldwin Creek

Storm Water Management

Begin the process of recovering urban impacted streams and their aquatic habitat:

- Reduce effective imperviousness of subbasin from 26.75% to 15%.
- Reduce modified habitat attributes and habitat degradation associated with urban runoff wherever possible.
- Restore fish passage to 0.9 miles of Baldwin Creek by removing four low-head dams and enhance fish habitat sufficient to raise the average QHEI of the reach from 51.5 to 60 along the creek's lower one-mile reach in Berea, at an estimated cost of \$507,000. See Attachment B for mapped locations.
- Reduce siltation and embedded substrate and enhance habitat by an average of 5 QHEI points through the installation of 2500 feet of streambank stabilization practices and 7500 feet of stream restoration practices, reducing sediment loading by 900 lbs/yr, nitrogen loading by 1450 lbs/yr and phosphorus loading by 550lbs/yr, at an estimated cost of \$2,125,000. See attachment B for a map of identified erosion areas.

Minimize the storm water impacts associated with new development:

- Manage the limited amount of new development likely in the subbasin.
- Maintain the remaining riparian vegetation along stream channel.
- Prioritize parcels for permanent protection via fee simple acquisition or the acquisition of conservation easements.

Reduce urban runoff rates and pollutant loadings:

- Human and animal bacteria loadings associated with storm water need to be reduced wherever possible.
- Install storm water retrofit practices in appropriate locations to add both water quality treatment and storage capacity, with an initial goal of treating 100 acres of the subwatershed, reducing nitrogen loading by 250 lbs/yr and phosphorus loading by 32 lbs/yr, at an estimated cost of \$1 million. See attachment C for a map of potential locations.

Home Sewage Treatment System Improvements

496 HSTSS exist in the watershed; at least 110 need to be upgraded.

Agricultural Runoff

No established problems exist from this source in the Abram Creek watershed.

Land Use Issues

No specific issues are a priority in this watershed.

Water Quality Problems in the North Royalton 'A' Tributary and in Healey Creek

Stream: North Royalton 'A' Tributary
Tributary to: East Branch of the Rocky River
Drainage Area: 1.72 square miles total Length: 3.3 miles Slope: N/A
Ohio EPA Use Designations: State Resource Water; Warm Water Habitat; Agricultural
and Industrial Water Supply; Primary Contact Recreation
Aquatic Life Use Attainment Status: 0.0 miles in Full Attainment, 0.6 miles in Partial
Attainment, and 0.4 miles in Nonattainment

Stream: Healey Creek
Tributary to: East Branch of the Rocky River
Drainage Area: 4.84 square miles total Length: 5.75 miles Slope: N/A
Ohio EPA Use Designations: State Resource Water; Warm Water Habitat; Agricultural
and Industrial Water Supply; Primary Contact Recreation
Aquatic Life Use Attainment Status: 0.0 miles in Full Attainment, 1.0 miles in Partial
Attainment, and 0.0 miles in Nonattainment

The land area drained by the North Royalton 'A' Tributary and Healey Creek is included on the maps of the East Branch of the Rocky River.

Problem Statement for the North Royalton ‘A’ Tributary

Water Resource Use Impairments	Point/Nonpoint Sources Present	Water Quality Problem Causes	TMDL Causes of Concern
<p>Fish and other wildlife should taste good. Not Impaired</p> <p>Fish should be free of abnormal tumors and other deformities. Not Impaired</p> <p>Fish and other wildlife populations should be diverse and healthy. Not Impaired</p> <p>Macroinvertebrate community populations should be diverse and healthy. Not Impaired</p> <p>There should be a lack of eutrophication or undesirable algae. Not Impaired</p> <p>The river should be free of drinking water consumption or taste and odor problems. Not Impaired</p> <p>The river should be safe for swimming and wading. Impaired</p> <p>The river should be aesthetically pleasing. Locally Impaired</p> <p>The amount and quality of sediment in the river should keep dredging activities within normal limits. Not Impaired</p> <p>There should be no added costs to agriculture Not Impaired</p> <p>Microscopic plants and animal populations should be healthy and diverse. Unknown</p> <p>Fish and wildlife habitat should be diverse. Threatened</p>	<p>Point Sources</p> <ul style="list-style-type: none"> • Impacted • Minor • Threatened <p>Combined sewer overflows or sanitary sewer outfalls.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened <p>Agricultural Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened • Not an issue <p>Urban Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened <p>Home Sewage Treatment System Discharges.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor <p>Wildlife wastes.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened 	<p>Nitrogen Loadings.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Habitat Modifications.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Bacteria and Pathogens.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Toxic Chemicals</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened 	<p>Nitrogen Loadings. Organic Enrichment/ Dissolved Oxygen Problems. Habitat Modifications. Bacteria and Pathogens. Toxic Chemicals</p> <p>None of the above</p>

Problem Statement for Healey Creek

Water Resource Use Impairments	Point/Nonpoint Sources Present	Water Quality Problem Causes	TMDL Causes of Concern
<p>Fish and other wildlife should taste good. Not Impaired</p> <p>Fish should be free of abnormal tumors and other deformities. Not Impaired</p> <p>Fish and other wildlife populations should be diverse and healthy. Not Impaired</p> <p>Macroinvertebrate community populations should be diverse and healthy. Not Impaired</p> <p>There should be a lack of eutrophication or undesirable algae. Not Impaired</p> <p>The river should be free of drinking water consumption or taste and odor problems. Not Impaired</p> <p>The river should be safe for swimming and wading. Impaired</p> <p>The river should be aesthetically pleasing. Locally Impaired</p> <p>The amount and quality of sediment in the river should keep dredging activities within normal limits. Not Impaired</p> <p>There should be no added costs to agriculture Not Impaired</p> <p>Microscopic plants and animal populations should be healthy and diverse. Unknown</p> <p>Fish and wildlife habitat should be diverse. Threatened</p>	<p>Point Sources</p> <ul style="list-style-type: none"> • Impacted • Minor • Threatened <p>Combined sewer overflows or sanitary sewer outfalls.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened <p>Agricultural Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened • Not an issue <p>Urban Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened <p>Home Sewage Treatment System Discharges.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor <p>Wildlife wastes.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened 	<p>Nitrogen Loadings.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Habitat Modifications.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Bacteria and Pathogens.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Toxic Chemicals</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened 	<p>Nitrogen Loadings. Organic Enrichment/ Dissolved Oxygen Problems. Habitat Modifications. Bacteria and Pathogens. Toxic Chemicals</p> <p style="text-align: center;">None of the above</p>

Problem Solving Strategies for the North Royalton ‘A’ Tributary and Healey Creek

Storm Water Management

Begin the process of recovering urban impacted streams and their aquatic habitat (see summary map in Attachment D):

- Restore habitat in the Upper Healey Creek subwatershed by restoring 1500 linear feet of incised channel in Venus Park in Brunswick using natural stream channel design, two-stage or self forming channel techniques, restoring QHEI to a minimum of 60, and reducing nitrogen loading by 400 lbs/yr and phosphorus loading by 150 lbs/yr, at an estimated cost of \$300,000.
- Install storm water wetland on vacant 3-acre property upstream of Venus Park, where three outlet pipes meet to form Healey Creek, to reduce nitrogen loading by 400 lbs/yr, phosphorus loading by 150 lbs/yr, and sediment loading by 200 tons/yr, at an estimated cost of \$200,000.
- Reconnect 1500 linear feet of floodplain along Healey Creek as it flows through North Park in Brunswick by removing levees and adding or expanding riparian wetlands and/or vernal pools to increase QHEI to a minimum of 60 and reduce sediment by 126 tons/yr, nitrogen loading by 200 lbs/yr, and phosphorus loading by 75 lbs/yr, at an estimated cost of \$300,000.
- Target residential neighborhoods upstream of Venus Park and upstream of North Park Lake for rain garden, rain barrel and fertilizer management outreach and deployment.
- Retrofit approximately 3500 feet of roadside ditch to improve storage, infiltration and water quality treatment along West Drive and East Drive in Brunswick, reducing nitrogen loading by 10 lbs/yr and phosphorus loading by 4 lbs/yr at an estimated cost of \$100,000.

Minimize the storm water impacts associated with new development:

- Manage the limited amount of new development likely in the subbasin.
- Maintain the remaining riparian vegetation along stream channel.
- Permanently protect 9000 linear feet of Healey Creek and its tributaries by acquiring interest in real property or conservation easements on the 25-acre Hudak property and 20-acre Custer property immediately upstream of North Park in Brunswick and the 10-acre Metro Church property, 85-acre Knight Development property, and 107-acre and 23-acre Fifth-Third Bank properties downstream of North Park in Brunswick, at an estimated cost of \$2.7 million.

Reduce urban runoff rates and pollutant loadings:

- Human and animal bacteria loadings associated with storm water need to be reduced wherever possible.

Home Sewage Treatment System Improvements

HSTS management is a minor issue in both of these subbasins.

Agricultural Runoff

No established problems exist from this source in these watersheds.

Land Use Issues

Conservation and other low impact developments need to be encouraged throughout the watershed.

Implement the Rocky River Upper West Branch Balanced Growth Plan.

Water Quality Problems in the West Branch of the Rocky River

Stream: West Branch of the Rocky River

Tributary to: Mainstem of the Rocky River

Drainage Area: 188.3square miles Length: 36.2 miles Slope: 16.0 feet per mile





Ohio EPA Use Designations: Water; Warm Water Habitat; Agricultural and Industrial Water Supply; Primary Contact Recreation

Aquatic Life Use Attainment Status: 23.96 miles in Full Attainment, 10.05 miles in Partial Attainment, and 0.0 miles in Nonattainment

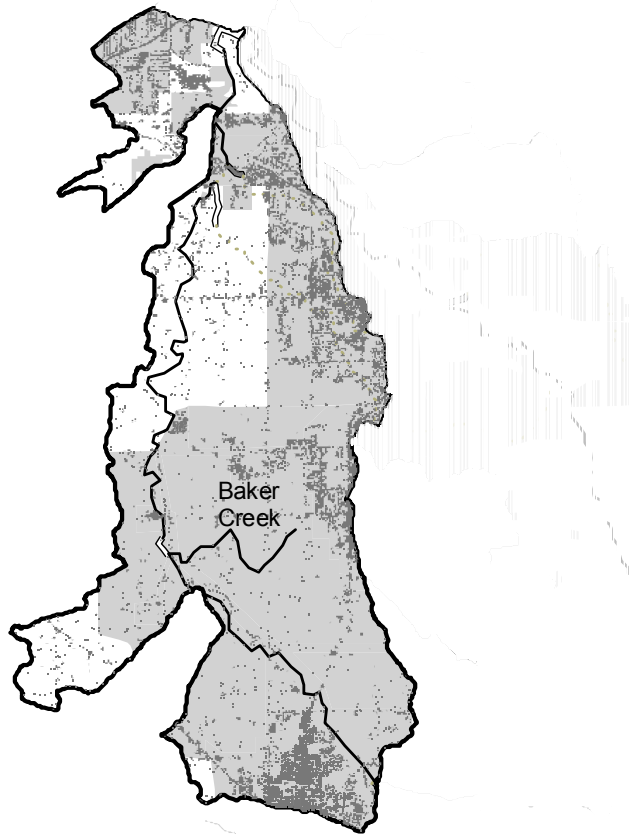
Agricultural Lands in the West Branch of the Rocky River



2001 Use Attainment Status

-  Full Attainment
-  Partial Attainment
-  Non Attainment
-  Not Assessed

Urbanized Lands in the West Branch of the Rocky River



2001 Use Attainment Status

-  Full Attainment
-  Partial Attainment
-  Non Attainment
-  Not Assessed

Darkened Areas are served with sanitary sewers or are likely to be sewered in the near future.

Problem Statement for the West Branch of the Rocky River

Water Resource Use Impairments	Point/Nonpoint Sources Present	Water Quality Problem Causes	TMDL Causes of Concern
<p>Fish and other wildlife should taste good. Not Impaired</p> <p>Fish should be free of abnormal tumors and other deformities. Not Impaired</p> <p>Fish and other wildlife populations should be diverse and healthy. Impaired</p> <p>Macroinvertebrate community populations should be diverse and healthy. Not Impaired</p> <p>There should be a lack of eutrophication or undesirable algae. Not Impaired</p> <p>The river should be free of drinking water consumption or taste and odor problems. Not Impaired</p> <p>The river should be safe for swimming and wading. Impaired</p> <p>The river should be aesthetically pleasing. Locally Impaired</p> <p>The amount and quality of sediment in the river should keep dredging activities within normal limits. Not Impaired</p> <p>There should be no added costs to agriculture Not Impaired</p> <p>Microscopic plants and animal populations should be healthy and diverse. Unknown</p> <p>Fish and wildlife habitat should be diverse. Threatened</p>	<p>Point Sources</p> <ul style="list-style-type: none"> • Impacted • Minor • Threatened <p>Combined sewer overflows or sanitary sewer outfalls.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened <p>Agricultural Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened • Not an issue <p>Urban Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened <p>Home Sewage Treatment System Discharges.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor <p>Wildlife wastes.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened 	<p>Nitrogen Loadings.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Habitat Modifications.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Bacteria and Pathogens.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Toxic Chemicals</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened 	<p>Nitrogen Loadings. Organic Enrichment/ Dissolved Oxygen Problems. Habitat Modifications. Bacteria and Pathogens. Toxic Chemicals</p> <p>None of the above</p>

Problem Solving Strategies for the West Branch of the Rocky River

Storm Water Management

Begin the process of recovering urban impacted streams and their aquatic habitat:

- Reduce effective imperviousness of lower portions of the West Branch to 15%.
- Reduce modified habitat attributes and habitat degradation associated with urban runoff wherever possible.

Minimize the storm water impacts associated with new development:

- Manage new development likely in the Strongsville and the City of Medina portions of the watershed.
- Maintain high degree of riparian vegetation along stream channel.

Reduce urban runoff rates and pollutant loadings:

- Human and animal bacteria loadings associated with storm water need to be reduced wherever possible.

Home Sewage Treatment System Improvements

1,421 HSTSs exist in the watershed; at least 600 need to be upgraded. Target areas include Columbia Township and Olmsted Township.

Agricultural Runoff

Improperly managed horse, cattle, and other farm animal wastes produce excessive nutrient and bacteria loadings that contribute marginally to documented problems in downstream areas

- Minimize localized problems that exist from livestock operations in the upper West Branch watershed in Medina County. Target remediation resources to horse operations discharging to the West Branch in Olmsted Township.

Minimize nutrient, fertilizer, and chemical runoff from crop production.

- Target cost-share resources to farms located in the Upper West Branch Watershed.

Land Use Issues

Conservation and other low impact developments need to be encouraged throughout the watershed.

Water Quality Problems in Baker Creek

Stream: Baker Creek

Tributary to: West Branch of the Rocky River

Drainage Area: 5.81 square miles Length: 8.2 miles Slope: 45.7 feet per mile

Ohio EPA Use Designations: Warm Water Habitat; Agricultural and Industrial Water Supply; Primary Contact Recreation

Aquatic Life Use Attainment Status: Not assessed in 2000 305(b) Report

See preceding West Branch maps for general conditions in Baker Creek. Baker Creek is unlabeled on these maps but is shown. It is the most upstream tributary that enters the West Branch from the East.

Problem Statement for Baker Creek

Water Resource Use Impairments	Point/Nonpoint Sources Present	Water Quality Problem Causes	TMDL Causes of Concern
<p>Fish and other wildlife should taste good. Not Impaired</p> <p>Fish should be free of abnormal tumors and other deformities. Not Impaired</p> <p>Fish and other wildlife populations should be diverse and healthy. Impaired</p> <p>Macroinvertebrate community populations should be diverse and healthy. Not Impaired</p> <p>There should be a lack of eutrophication or undesirable algae. Not Impaired</p> <p>The river should be free of drinking water consumption or taste and odor problems. Not Impaired</p> <p>The river should be safe for swimming and wading. Impaired</p> <p>The river should be aesthetically pleasing. Locally Impaired</p> <p>The amount and quality of sediment in the river should keep dredging activities within normal limits. Not Impaired</p> <p>There should be no added costs to agriculture Not Impaired</p> <p>Microscopic plants and animal populations should be healthy and diverse. Unknown</p> <p>Fish and wildlife habitat should be diverse. Threatened</p>	<p>Point Sources</p> <ul style="list-style-type: none"> • Impacted • Minor • Threatened <p>Combined sewer overflows or sanitary sewer outfalls.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened <p>Agricultural Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened • Not an issue <p>Urban Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened <p>Home Sewage Treatment System Discharges.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor <p>Wildlife wastes.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened 	<p>Nitrogen Loadings.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Habitat Modifications.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Bacteria and Pathogens.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Toxic Chemicals</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened 	<p>Nitrogen Loadings. Organic Enrichment/ Dissolved Oxygen Problems. Habitat Modifications. Bacteria and Pathogens. Toxic Chemicals</p> <p style="text-align: center;">None of the above</p>

Water Quality Problems in Plum Creek at Olmsted Falls

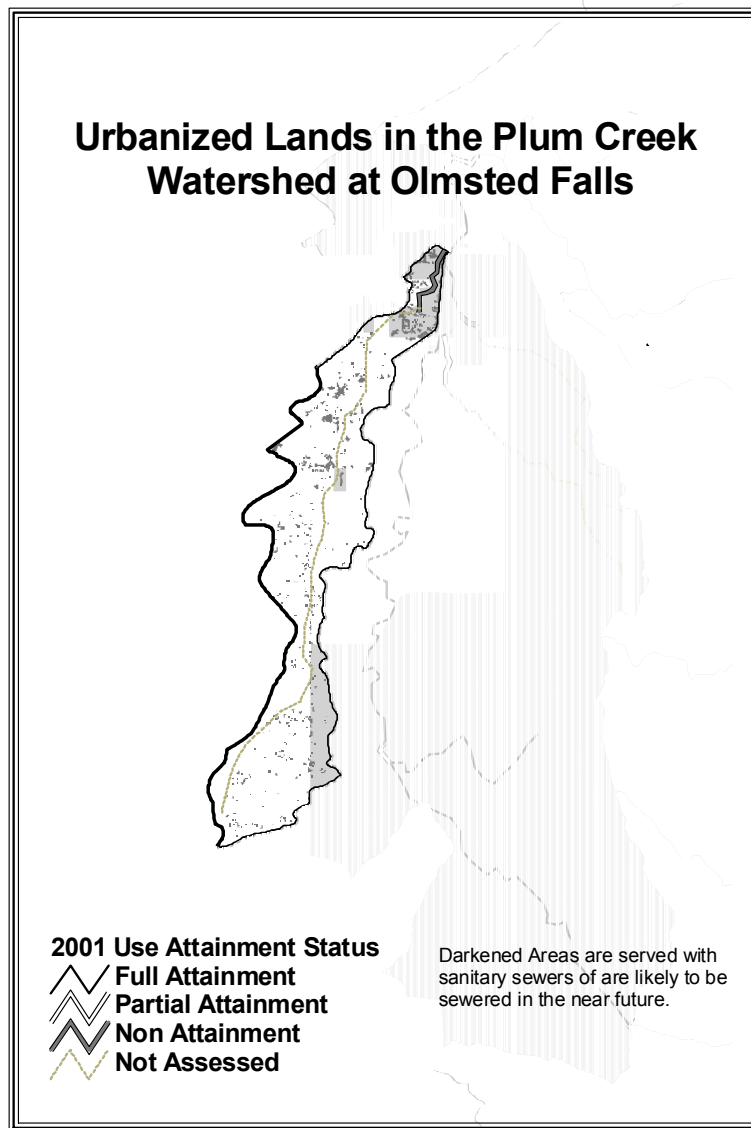
Stream: Plum Creek near Olmsted Falls

Tributary to: West Branch of the Rocky River

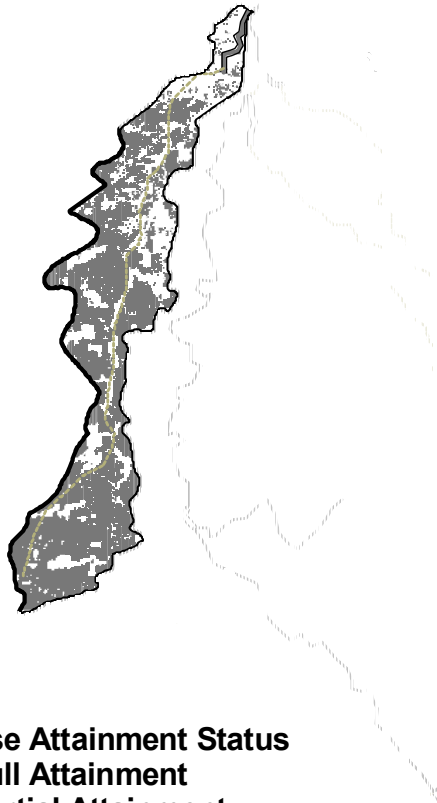
Drainage Area: 18.9 square miles Length: 14.8 miles Slope: 16.4 feet per mile

Ohio EPA Use Designations: Warm Water Habitat; Agricultural and Industrial Water Supply; Primary Contact Recreation

Aquatic Life Use Attainment Status: 0.0 miles in Full Attainment, 0.0 miles in Partial Attainment, and 3.0 miles in Nonattainment



Agricultural Lands in Plum Creek at Olmsted Falls



2001 Use Attainment Status

-  Full Attainment
-  Partial Attainment
-  Non Attainment
-  Not Assessed

Problem Statement for Plum Creek at Olmsted Falls

Water Resource Use Impairments	Point/Nonpoint Sources Present	Water Quality Problem Causes	TMDL Causes of Concern
<p>Fish and other wildlife should taste good. Not Impaired</p> <p>Fish should be free of abnormal tumors and other deformities. Not Impaired</p> <p>Fish and other wildlife populations should be diverse and healthy. Impaired</p> <p>Macroinvertebrate community populations should be diverse and healthy. Impaired</p> <p>There should be a lack of eutrophication or undesirable algae. Not Impaired</p> <p>The river should be free of drinking water consumption or taste and odor problems. Not Impaired</p> <p>The river should be safe for swimming and wading. Impaired</p> <p>The river should be aesthetically pleasing. Locally Impaired</p> <p>The amount and quality of sediment in the river should keep dredging activities within normal limits. Not Impaired</p> <p>There should be no added costs to agriculture Not Impaired</p> <p>Microscopic plants and animal populations should be healthy and diverse. Unknown</p> <p>Fish and wildlife habitat should be diverse. Threatened</p>	<p>Point Sources</p> <ul style="list-style-type: none"> • Impacted • Minor • Threatened <p>Combined sewer overflows or sanitary sewer outfalls.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened <p>Agricultural Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened • Not an issue <p>Urban Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened <p>Home Sewage Treatment System Discharges.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor <p>Wildlife wastes.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened 	<p>Nitrogen Loadings.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Habitat Modifications.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Bacteria and Pathogens.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Toxic Chemicals</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened 	<p>Nitrogen Loadings. Organic Enrichment/ Dissolved Oxygen Problems. Habitat Modifications. Bacteria and Pathogens. Toxic Chemicals</p> <p>None of the above</p>

Problem Solving Strategies for Plum Creek at Olmsted Falls

Storm Water Management

Begin the process of recovering urban impacted streams and their aquatic habitat:

- Reduce effective imperviousness of lower portions of Plum Creek to 15%.
- Reduce modified habitat attributes and habitat degradation associated with urban runoff wherever possible.

Minimize the storm water impacts associated with new development:

- Manage new development likely in the Olmsted Township and Olmsted Falls portions of the watershed.
- Maintain the remaining of riparian vegetation along stream channel.

Reduce urban runoff rates and pollutant loadings:

- Human and animal bacteria loadings associated with storm water need to be reduced wherever possible.

Home Sewage Treatment System Improvements

171 HSTSs exist in the watershed; at least 73 need to be upgraded. Target areas include Columbia Township and Olmsted Township.

Agricultural Runoff

Improperly managed horse, cattle, and other farm animal wastes produce excessive nutrient and bacteria loadings that contribute marginally to documented problems in downstream areas

- Minimize localized problems that exist from livestock operations in the upper portion of the watershed in Columbia Township.

Minimize nutrient, fertilizer, and chemical runoff from crop production.

- Target cost-share resources to farms located in the upper portion of the watershed.

Land Use Issues

Conservation and other low impact developments need to be encouraged throughout the watershed.

Water Quality Problems in the Upper West Branch of the Rocky River

Stream: Mallet Creek

Tributary to: West Branch of the Rocky River

Drainage Area: 18.75 square miles Length: 11.4 miles Slope: 27.5 feet per mile

Ohio EPA Use Designations: Warm Water Habitat; Agricultural and Industrial Water Supply; Primary Contact Recreation

Aquatic Life Use Attainment Status: Not assessed in 2000 305(b) Report

Stream: North Branch of the Rocky River

Tributary to: West Branch of the Rocky River

Drainage Area: 37.55 square miles Length: 5.4 miles Slope: 22.4 feet per mile

Ohio EPA Use Designations: Warm Water Habitat; Agricultural and Industrial Water Supply; Primary Contact Recreation

Aquatic Life Use Attainment Status: 0.79 miles in Full Attainment, 0.0 miles in Partial Attainment, and 0.0 miles in Nonattainment

Stream: Granger Ditch including Remsen Creek

Tributary to: North Branch of the Rocky River

Drainage Area: 14.62 square miles Length: 6.5 miles Slope: 30.5 feet per mile

Aquatic Life Use Attainment Status: 0.0 miles in Full Attainment, 8.7 miles in Partial Attainment, and 3.37 miles in Nonattainment

Ohio EPA Use Designations: Warm Water Habitat; Agricultural and Industrial Water Supply; Primary Contact Recreation

Aquatic Life Use Attainment Status: Not assessed in the 2000 305(b) Report

Stream: Plum Creek near Brunswick

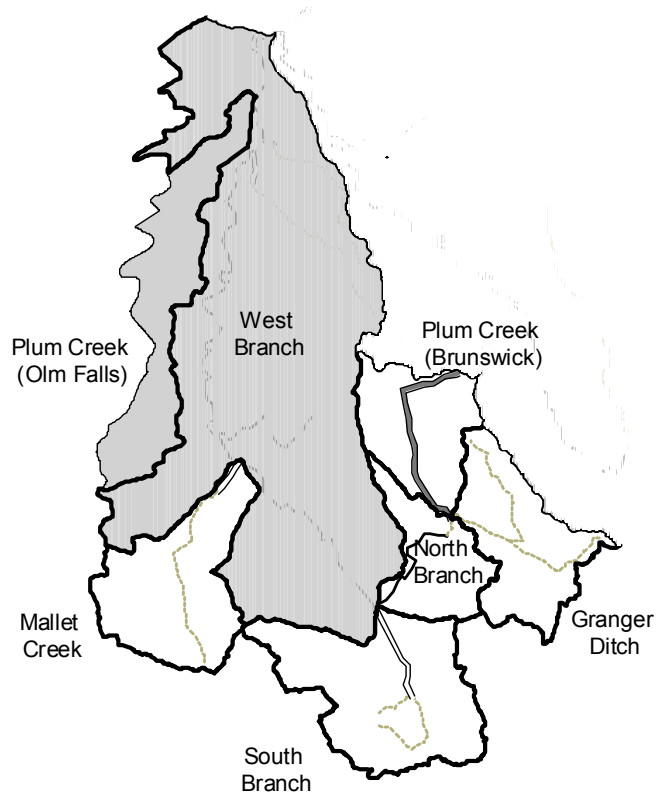
Tributary to: North Branch of the Rocky River

Drainage Area: 12.79 square miles Length: 7.1 miles Slope: 21.4 feet per mile

Ohio EPA Use Designations: Warm Water Habitat; Agricultural and Industrial Water Supply; Primary Contact Recreation

Aquatic Life Use Attainment Status: 0.0 miles in Full Attainment, 1.0 miles in Partial Attainment, and 0.0 miles in Nonattainment

Water Quality Use Attainment in the Upper West Branch of the Rocky River



2001 Use Attainment Status

- Full Attainment
- Partial Attainment
- Non Attainment
- Not Assessed

Darkened Areas are described elsewhere.

Problem Statement for Mallet Creek

Water Resource Use Impairments	Point/Nonpoint Sources Present	Water Quality Problem Causes	TMDL Causes of Concern
<p>Fish and other wildlife should taste good. Not Impaired</p> <p>Fish should be free of abnormal tumors and other deformities. Not Impaired</p> <p>Fish and other wildlife populations should be diverse and healthy. Impaired</p> <p>Macroinvertebrate community populations should be diverse and healthy. Not Impaired</p> <p>There should be a lack of eutrophication or undesirable algae. Not Impaired</p> <p>The river should be free of drinking water consumption or taste and odor problems. Not Impaired</p> <p>The river should be safe for swimming and wading. Impaired</p> <p>The river should be aesthetically pleasing. Locally Impaired</p> <p>The amount and quality of sediment in the river should keep dredging activities within normal limits. Not Impaired</p> <p>There should be no added costs to agriculture Not Impaired</p> <p>Microscopic plants and animal populations should be healthy and diverse. Unknown</p> <p>Fish and wildlife habitat should be diverse. Threatened</p>	<p>Point Sources</p> <ul style="list-style-type: none"> • Impacted • Minor • Threatened <p>Combined sewer overflows or sanitary sewer outfalls.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened <p>Agricultural Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened • Not an issue <p>Urban Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened <p>Home Sewage Treatment System Discharges.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor <p>Wildlife wastes.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened 	<p>Nitrogen Loadings.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Habitat Modifications.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Bacteria and Pathogens.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Toxic Chemicals</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened 	<p>Nitrogen Loadings. Organic Enrichment/ Dissolved Oxygen Problems. Habitat Modifications. Bacteria and Pathogens. Toxic Chemicals</p> <p>None of the above</p>

Problem Statement for the North Branch of the Rocky River

Water Resource Use Impairments	Point/Nonpoint Sources Present	Water Quality Problem Causes	TMDL Causes of Concern
<p>Fish and other wildlife should taste good. Not Impaired</p> <p>Fish should be free of abnormal tumors and other deformities. Not Impaired</p> <p>Fish and other wildlife populations should be diverse and healthy. Not Impaired</p> <p>Macroinvertebrate community populations should be diverse and healthy. Not Impaired</p> <p>There should be a lack of eutrophication or undesirable algae. Not Impaired</p> <p>The river should be free of drinking water consumption or taste and odor problems. Not Impaired</p> <p>The river should be safe for swimming and wading. Impaired</p> <p>The river should be aesthetically pleasing. Locally Impaired</p> <p>The amount and quality of sediment in the river should keep dredging activities within normal limits. Not Impaired</p> <p>There should be no added costs to agriculture Not Impaired</p> <p>Microscopic plants and animal populations should be healthy and diverse. Unknown</p> <p>Fish and wildlife habitat should be diverse. Threatened</p>	<p>Point Sources</p> <ul style="list-style-type: none"> • Impacted • Minor • Threatened <p>Combined sewer overflows or sanitary sewer outfalls.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened <p>Agricultural Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened • Not an issue <p>Urban Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened <p>Home Sewage Treatment System Discharges.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor <p>Wildlife wastes.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened 	<p>Nitrogen Loadings.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Habitat Modifications.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Bacteria and Pathogens.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Toxic Chemicals</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened 	<p>Nitrogen Loadings. Organic Enrichment/ Dissolved Oxygen Problems. Habitat Modifications. Bacteria and Pathogens. Toxic Chemicals</p> <p style="text-align: center;">None of the above</p>

Problem Statement for Remsen Creek including Granger Ditch

Water Resource Use Impairments	Point/Nonpoint Sources Present	Water Quality Problem Causes	TMDL Causes of Concern
<p>Fish and other wildlife should taste good. Not Impaired</p> <p>Fish should be free of abnormal tumors and other deformities. Not Impaired</p> <p>Fish and other wildlife populations should be diverse and healthy. Not Impaired</p> <p>Macroinvertebrate community populations should be diverse and healthy. Not Impaired</p> <p>There should be a lack of eutrophication or undesirable algae. Not Impaired</p> <p>The river should be free of drinking water consumption or taste and odor problems. Not Impaired</p> <p>The river should be safe for swimming and wading. Impaired</p> <p>The river should be aesthetically pleasing. Locally Impaired</p> <p>The amount and quality of sediment in the river should keep dredging activities within normal limits. Not Impaired</p> <p>There should be no added costs to agriculture Not Impaired</p> <p>Microscopic plants and animal populations should be healthy and diverse. Unknown</p> <p>Fish and wildlife habitat should be diverse. Threatened</p>	<p>Point Sources</p> <ul style="list-style-type: none"> • Impacted • Minor • Threatened <p>Combined sewer overflows or sanitary sewer outfalls.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened <p>Agricultural Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened • Not an issue <p>Urban Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened <p>Home Sewage Treatment System Discharges.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor <p>Wildlife wastes.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened 	<p>Nitrogen Loadings.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Habitat Modifications.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Bacteria and Pathogens.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Toxic Chemicals</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened 	<p>Nitrogen Loadings. Organic Enrichment/ Dissolved Oxygen Problems. Habitat Modifications. Bacteria and Pathogens. Toxic Chemicals</p> <p>None of the above</p>

Problem Statement for Plum Creek at Brunswick

Water Resource Use Impairments	Point/Nonpoint Sources Present	Water Quality Problem Causes	TMDL Causes of Concern
<p>Fish and other wildlife should taste good.</p> <p style="text-align: center;">Not Impaired</p> <p>Fish should be free of abnormal tumors and other deformities.</p> <p style="text-align: center;">Not Impaired</p> <p>Fish and other wildlife populations should be diverse and healthy.</p> <p style="text-align: center;">Impaired</p> <p>Macroinvertebrate community populations should be diverse and healthy.</p> <p style="text-align: center;">Not Impaired</p> <p>There should be a lack of eutrophication or undesirable algae.</p> <p style="text-align: center;">Not Impaired</p> <p>The river should be free of drinking water consumption or taste and odor problems.</p> <p style="text-align: center;">Not Impaired</p> <p>The river should be safe for swimming and wading.</p> <p style="text-align: center;">Impaired</p> <p>The river should be aesthetically pleasing.</p> <p style="text-align: center;">Locally Impaired</p> <p>The amount and quality of sediment in the river should keep dredging activities within normal limits.</p> <p style="text-align: center;">Not Impaired</p> <p>There should be no added costs to agriculture</p> <p style="text-align: center;">Not Impaired</p> <p>Microscopic plants and animal populations should be healthy and diverse.</p> <p style="text-align: center;">Unknown</p> <p>Fish and wildlife habitat should be diverse.</p> <p style="text-align: center;">Threatened</p>	<p>Point Sources</p> <ul style="list-style-type: none"> • Impacted • Minor • Threatened <p>Combined sewer overflows or sanitary sewer outfalls.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened <p>Agricultural Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened • Not an issue <p>Urban Runoff.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor • Threatened <p>Home Sewage Treatment System Discharges.</p> <ul style="list-style-type: none"> • Major • Moderate • Minor <p>Wildlife wastes.</p> <ul style="list-style-type: none"> • Present • Absent • Threatened 	<p>Nitrogen Loadings.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Habitat Modifications.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Bacteria and Pathogens.</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened <p>Toxic Chemicals</p> <ul style="list-style-type: none"> • High Magnitude • Moderate Magnitude • Low Magnitude • Threatened 	<p>Nitrogen Loadings.</p> <p>Organic Enrichment/ Dissolved Oxygen Problems.</p> <p>Habitat Modifications.</p> <p>Bacteria and Pathogens.</p> <p>Toxic Chemicals</p> <p style="text-align: center;">None of the above</p>

Problem Solving Strategies for the Upper West Branch of the Rocky River

Storm Water Management

Begin the process of recovering urban impacted streams and their aquatic habitat:

- Reduce effective imperviousness of lower portions of the South Branch and in Plum Creek at Brunswick to 15%.
- Reduce modified habitat attributes and habitat degradation associated with urban runoff wherever possible.
- Restore habitat and reduce streambank erosion through the restoration of 3000 linear feet of Champion Creek in the City of Medina, using soft engineering and natural stream channel design techniques to reduce nitrogen loading by 100 lbs/yr, at a cost of \$500,000.

Minimize the storm water impacts associated with new development:

- Manage new development likely in and around the City of Medina and throughout Medina Township.
- Maintain high degree of riparian vegetation along stream channel.

Reduce urban runoff rates and pollutant loadings:

- Human and animal bacteria loadings associated with storm water need to be reduced wherever possible.

Home Sewage Treatment System Improvements

An estimated 500 HSTSs exist in the watershed; at and as many as 150 may need to be upgraded.

Agricultural Runoff

Improperly managed horse, cattle, and other farm animal wastes produce excessive nutrient and bacteria loadings that contribute marginally to documented problems in downstream areas

- Minimize localized problems that exist from livestock operations in Mallet Creek and in the North Branch watershed in Medina County.

Minimize nutrient, fertilizer, and chemical runoff from crop production.

- Target cost-share resources to farms located in the Mallet Creek and North Branch Watersheds.

Land Use Issues

Conservation and other low impact developments need to be encouraged throughout the watershed.

Implement the Rocky River Upper West Branch Balanced Growth Plan.