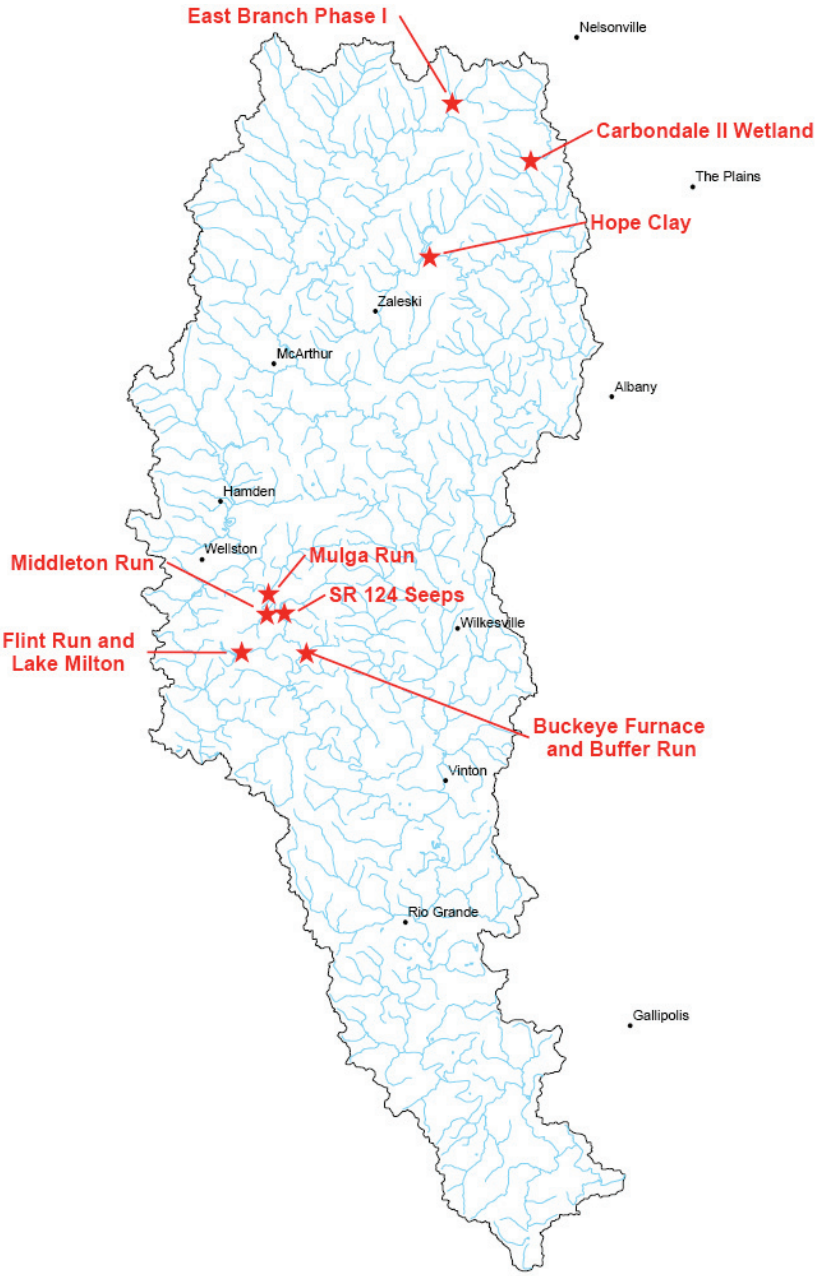
• The Raccoon Creek Watershed Project is a local partnership working towards conservation, stewardship, and restoration of the watershed for a healthier stream and community. The partnership consists of multiple agencies and individuals working to restore and promote the waters of Raccoon Creek. Encompassing over 683 square miles, the watershed lies in portions of six southeast Ohio Counties (Athens, Hocking, Meigs, Vinton, Jackson and Gallia). Raccoon Creek is one of Ohio's longest streams, measuring 112 miles draining into the Ohio River in Gallia County. Major sources of impairment to the stream include acid mine drainage (AMD), drainage from wastewater treatment facilities, and industrial discharges. By and large, AMD contributes to the vast majority of pollution issues in the watershed.

• The watershed currently has over 25,610 acres of underground coal mines and 21,550 acres of surface coal mines within its boundaries. About 110 acres of abandoned coal refuse piles also lie in the watershed. These abandoned mines and refuse piles leach thousands of pounds of sulfuric acid and metals into the creek daily, significantly degrading the water quality of streams. In the late 1990's representatives from several partnering agencies, including the Institute for Local Government and Rural Development (ILGARD), Ohio Department of Natural Resources, Division of Mineral Resource Management, and Ohio EPA, prioritized sites that contributed the most AMD pollution to Raccoon Creek and began to implement restoration strategies on these sites. Because the watershed is so large, three major sub-shed divisions are used to break up the region into more manageable sections. These consist of the Headwaters, Little Raccoon, and the Middle Basin sub-sheds. Each of these sections has priority AMD projects. Some of these projects have been completed, some are in progress, and some are anticipated future projects.

• Headwaters

• The major priority sites in the headwaters sub-shed include East Branch, where several impacted tributaries contribute to significant acid and metal loadings in Raccoon Creek. Brushy Creek and the Mainstem of Raccoon



Raccoon Creek near Moonville, Photo by Ben McCament

Creek above Brushy Creek are also priority AMD abatement sites.

• Little Raccoon

• Flint Run is the largest contributor of AMD in the Little Raccoon Creek watershed. A majority of this (90%) is attributed to a 240-acre site in the headwaters. This site, called Broken Aro, previously housed a coal preparation facility and mine tailings dump. Other major AMD contributors in this basin include Mulga Run, Buffer Run and Goose Run.

• Middle Basin

• Major acid contributors in the middle basin include Rock Camp and Pierce Run. Rock Camp is the most consistent contributor of AMD, and has net acidic water regardless of flow. Pierce Run has experienced some net alkaline flows; it is thought that this might result from current mining operations in the area.

• Watershed Outreach

• In addition to the technical work of AMD remediation, other activities in the watershed are geared toward meeting goals of stewardship and conservation in the region. Annual litter pick-ups, tree-plantings and canoe-floats all encourage residents to become stewards of our watershed. School programs for youths help educate students about water quality, acid mine drainage, and the value of clean water. In addition, a new community group has formed to address access issues for canoers and kayakers who wish to paddle on the creek.

For further updates on the progress in Raccoon Creek,
please visit our webpage at:
www.raccooncreek.org

Reductions

Total acid load reduction = 5,592 lbs/day

Total metal load reduction = 1,001 lbs/day

Data derived using the Mean Annual Load Method (Stoertz, 2004).

Attainment Miles

Total stream miles assessed impacted by mine drainage = **190 miles**

Target #1 indicates 30% attainment of impaired streams by 2010 = **57 miles**

2006 progress = **23.3 miles** meeting Full WWH attainment

(48 miles assessed in 2006)

Completion and Costs

Sub-target 2
Total projects proposed in three Raccoon Creek Watershed
AMDATS = 25

Total projects complete = 9

Design = $1,421,573
Construction = $6,253,282

Total Costs through 2008 = $7,674,855

Timeline of the Raccoon Creek Watershed
Project Milestones & AMD Projects

This timeline demonstrates the history of the Raccoon Creek Watershed Restoration Partnership started almost two decades ago by a group of concerned local citizens. Today, the partnership consists of multiple state and local agencies and private citizens. AMD projects have been administered through the Vinton Soil and Water Conservation District and Ohio University's Voinovich Center (ILGARD), with funding from various state and federal grants but mostly from Ohio EPA's 319 program and ODNR-MRM's AMD program.

1980s
Formation of Raccoon Creek Improvement Committee (RCIC): Grassroots citizens group to address water quality in Raccoon Creek

Early 1990s
RCIC invites citizens from all six counties to join efforts

Late 1990s
Formation of Raccoon Creek Watershed Partnership, a loosely based partnership of agencies to address technical AMD issues

1999 State Route 124 Strip Pit and Buckeye Furnace Project completed

2000 Little Raccoon Creek AMDAT completed

Watershed Coordinator position funded for six years

2001 Headwaters AMDAT completed

State Route 124 seeps project completed

2003 Mulga Run project completed

Middle Basin AMDAT completed

Completed management plan for Raccoon Creek Watershed

2004 Carbondale II project completed

2005 Middle Run-Salem Road project completed

2006 Raccoon Creek Water Trail Association formed

Mission to Establish a water trail on Raccoon Creek

Flint Run and Lake Milton Projects completed

Watershed Coordinator three year extension funded

2007 Raccoon Creek Watershed Partnership formed 501 (c) 3

2008 East Branch Phase I AMD Project

2009 Pierce Run AMD Project

East Branch Phase II Project

Projects Completed Jan. 1, 2007 – Dec. 31, 2007

East Branch Phase I	**$ 976,725**

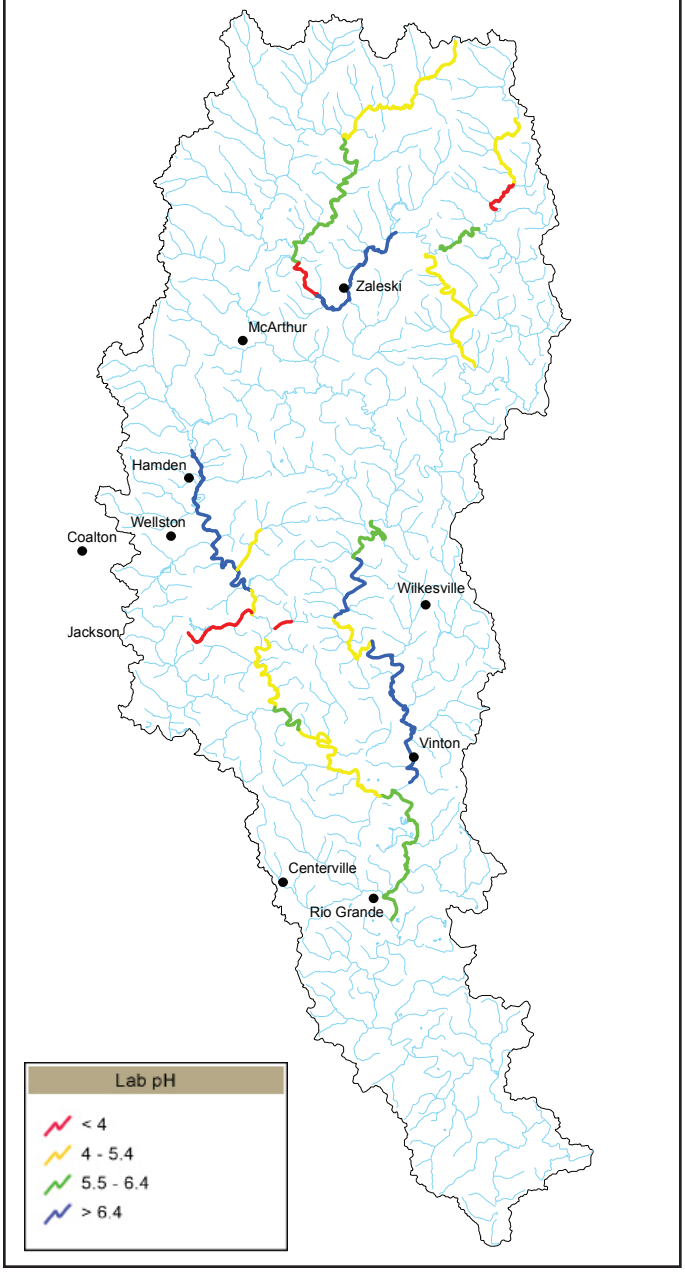
Load Reductions will be evaluated in 2008 for this project

	East Branch Phase I
Acid Load	1,174 lbs/day
Metal Load	143 lbs/day

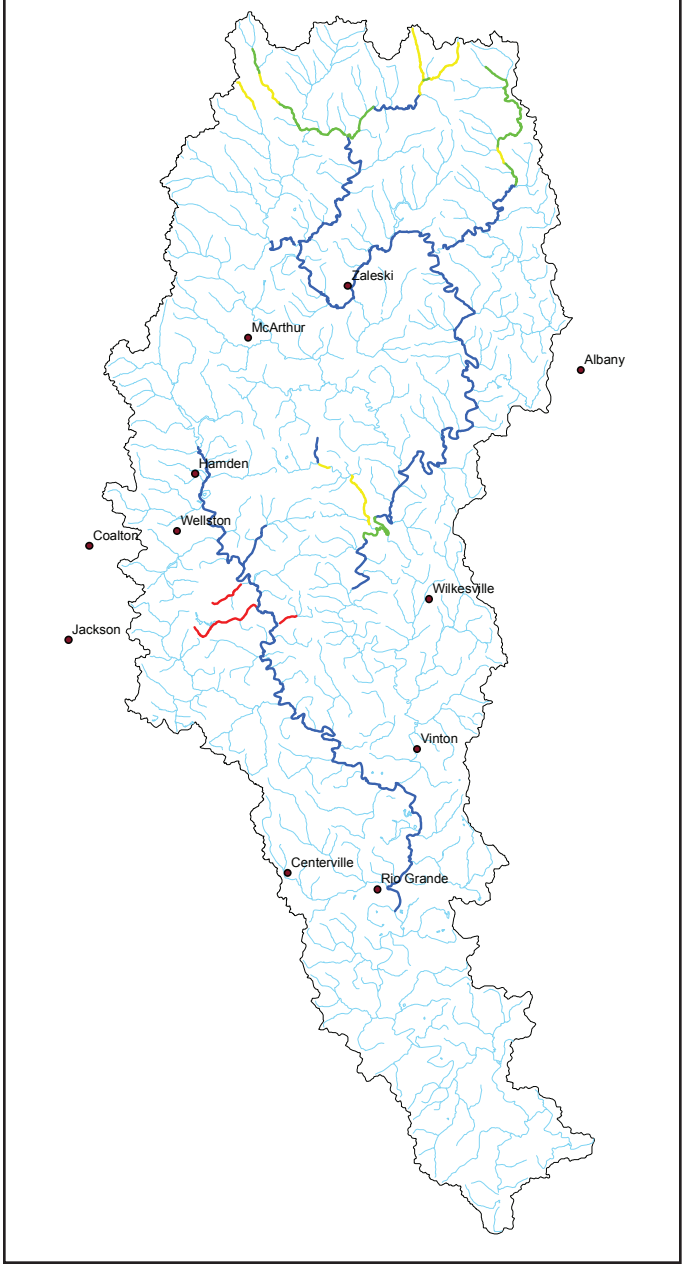
Cumulative BMP's installed

Treatment Installed	East Branch Phase I
Open Limestone Channel	1,100 *linear feet*
Steel Slag Leach Bed	16,251 *square feet*
Settling pond with limestone berms	42,000 *square feet*
Reclaim gob pile	4.8 *acres*
Limestone J-trench	12 *linear feet*

Raccoon Creek baseline pH

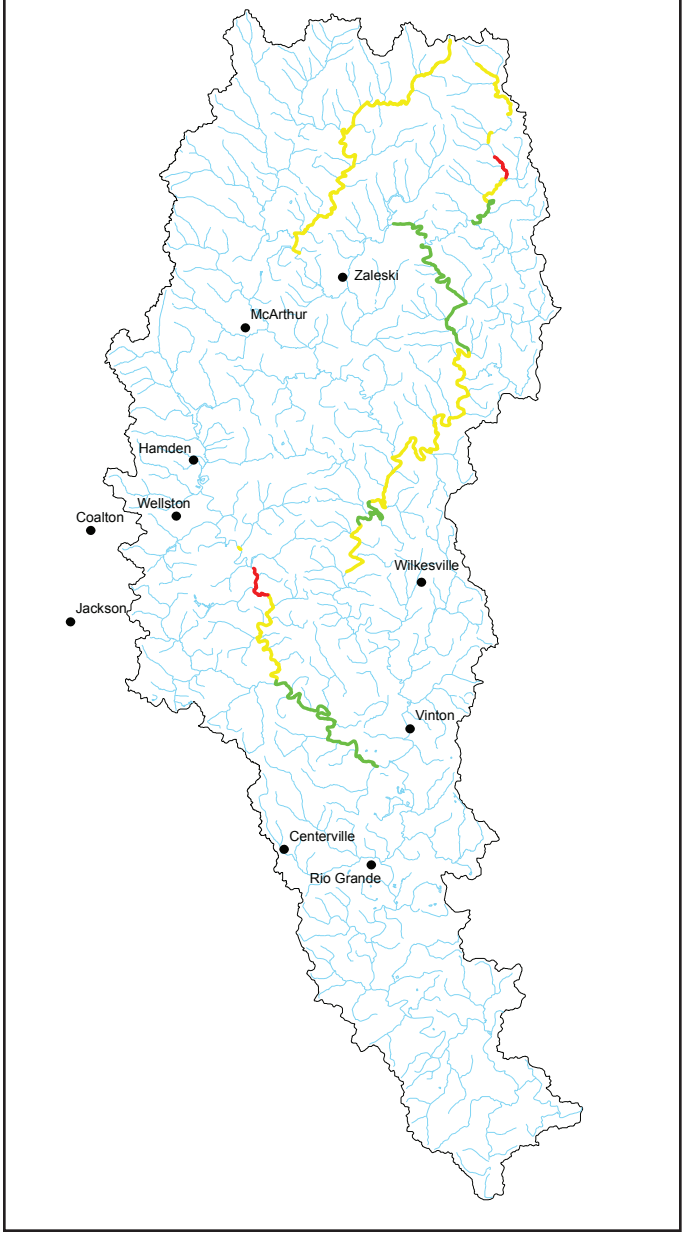


Raccoon Creek 2008 pH

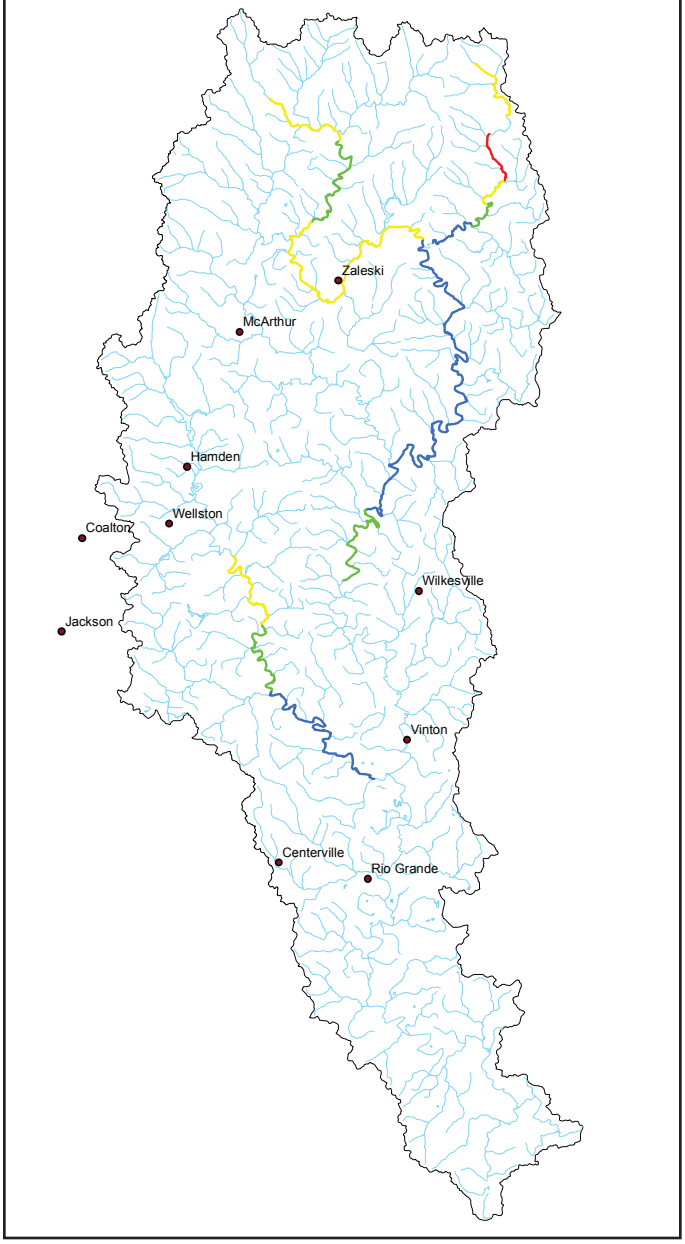


In Raccoon Creek pH values have improved throughout the watershed from baseline conditions (1994-2001) to 2008. Raccoon Creek mainstem, Hewett Fork and Little Raccoon Creek average pH values have increased from a range of 4.0-5.4 during baseline to 5.9-8.5 in 2008. In 2008, 9.2 river miles in Hewett Fork, 31.6 river miles in Little Raccoon Creek, and 50.4 miles along the mainstem of Raccoon Creek all met the pH standard (pH >6.5).On the mainstem of Raccoon Creek there were an aditional 24.7 miles attaining the pH standard (6.5) as compared to last year's data.

Raccoon Creek 2006 MAIS



Raccoon Creek 2008 MAIS



Macroinvertebrate Aggregated Index for Streams

- 0 - 7
- 8 - 11
- 12 - 15
- > 15

MAIS samples were collected throughout Raccoon Creek in 2008, these stations has been established as annual monitoring stations for macroinvertebrates. These sites will be used to track incremental changes in future years.

MAIS samples were collected throughout Raccoon Creek from 2005 through 2008. These stations have been established as annual monitoring stations for macroinvertebrates they will be used to track incremental changes in future years. After each station amasses five samples (five years of data) a regression analysis can be used to determine changes. One station on Hewett Fork has data from 2001-2008, HF090 (RM 8.3). The regression analysis for this site indicates 'no statistical change' over the seven year period. There was a slight score increase from 2005 to 2006, but scores have been variable in 2007 and 2008 (P value 0.17) (Johnson 2009, personal communication).

After 2009 when there are at least five sampling events to perform the more robust regression analysis, an "area of degradation" analysis can be used to assess degradation along a section of stream. In Hewett Fork in 2008, along river mile 13.4 to 0.9, the area of degradation was similar to that of 2006 (-35 compared to -34), apparently recovering after declining to -62 in 2007. The first three stations from RM 13.4 to 8.3 recovered to 2006 levels, and the last two stations (RM 4.0 to 0.9), more than 3 river miles, met the cutoff that approximates WWH attainment (MAIS score >12).

Missing data in 2005 and 2007 made direct comparisons more difficult, however, from 2005 to 2006, there was noticeable improvement (area of degradation reduced by half, -164 to -58).

From 2006 to 2007, there was again a marked improvement (area of degradation declined from -39 to +16). In 2008, there was a small drop in quality (from +16 to +4), but still a considerable improvement over 2005 and 2006 (Figure 2).

Figure 1. Area of degradation for MAIS scores in Hewett Fork from 2007 to 2008.

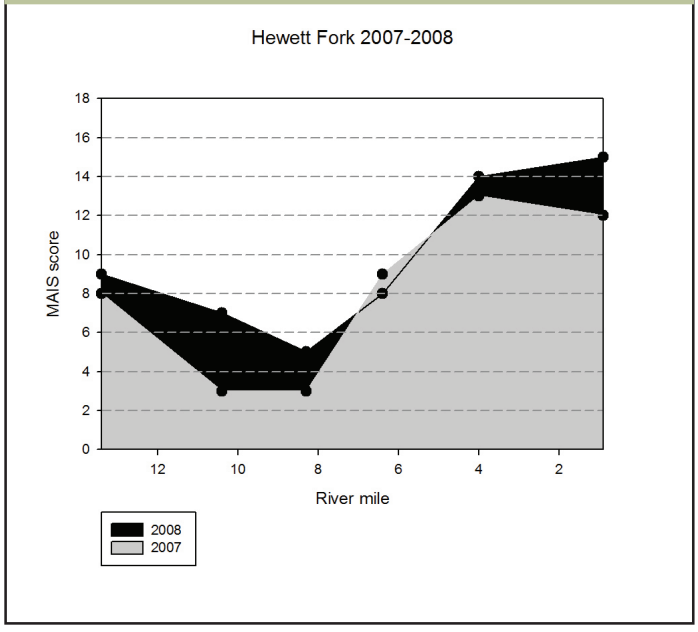


Figure 2. Area of degradation for MAIS scores in Little Raccoon Creek from 2006 to 2008.