Updated 9/2003

Watershed Restoration Action Strategy (WRAS)
State Water Plan Subbasin 20D
Raccoon Creek
(Ohio River)
Allegheny, Beaver and Washington Counties

Introduction

Subbasin 20D includes Raccoon Creek watershed, the Ohio River from the confluence of Raccoon Creek downstream to the Ohio/West Virginia line, and tributaries of the Ohio River from Cross Creek north to Tomlinson Run, which flow into West Virginia before entering the Ohio River. The total drainage area of the subbasin is 327 square miles, 184 square miles in the Raccoon Creek watershed and 63 square miles in Cross Creek watershed. A total of 680 streams are located in the subbasin. The subbasin is part of **HUC Area 5030001, Upper Ohio River**, a Category I, FY99/2000 Priority watershed in the Unified Watershed Assessment.

Geology/Soils

The entire subbasin is in the Western Allegheny Plateau Ecoregion. The upper third of the subbasin is in the Monongahela Transition Zone (70b). Streams in this portion have highly dissected the terrain so that most of the original plateau surface is no longer evident. The lower two-thirds of the subbasin is in the Pittsburgh Low Plateau (70c), which is characterized by rounded or knobby hills, narrow valleys, entrenched rivers, fluvial terraces, and gently dipping strata. Much of this area is devoted to farming or coal mining. Strata in both sections are composed of nearly horizontal sequences of sandstone, shale, limestone, and coal from the Pennsylvanian Period. Coals in the subbasin have been extensively mined by surface and underground methods.

Soils vary depending on the parent rock and range from well-drained silty loam soils overlaying limestone and shale bedrock, to well drained and moderately well drained shaley, silt loam soils overlaying shale and sandstone. Slopes also vary from relatively steep to gently sloping. Limitations to agriculture stem from the steep slopes and slow soil permeability. Pasturelands are located on some of the steep slopes. Slope erosion can occur from inappropriate grazing and cultivation practices. Upper Raccoon Creek soils are prone to slippage due to a shallower root zone of the soil associations. Conservation practices help to control erosion.

Land Use

The subbasin has a combination of agricultural, forested, abandoned surface mines, and urban lands. The population was 39,300 in 1990 and is projected to grow to 54,000 by 2040. The influx of residential development is expected to continue to grow with improvements in the regional highway systems. The new Pittsburgh International Airport presents additional commercial development pressures. The PA Turnpike Commission's Southern Beltway linking I-79 to the new Pittsburgh International Airport will pass through Raccoon Creek watershed and likely add new development pressures to the subbasin.

Raccoon Creek watershed has 14 municipalities in Washington County and 17 municipalities in Beaver County. Land use in the Raccoon Creek watershed was 35% agricultural, urban land use 5%, and 52% woodlands in 1993. The upper portion of the watershed has numerous surface

mines. The lower and central Raccoon Creek watershed contains some of the most actively farmed land in Washington and Beaver Counties. Farming is the dominant industry in Washington Co. Upper Raccoon Creek watershed is more urban than the lower portion.

Natural/Recreational Resources:
Public lands in the watershed include Raccoon State Park in Beaver County, encompassing about 7,000 acres, Hillman State Park in Washington County (3,600 acres), plus approximately 5,500 acres of scattered State Game Lands. Development of a canoe corridor on Raccoon Creek through to the Ohio River and a rails-to-trails from the abandoned Weirton to Carnegie rail line are in the planing stages.

Three man-made lakes are located in the watershed:

- The 55-acre Cherry Valley Reservoir was created for public water supply; but the main use is presently fishing. Detention time is 35 days, depth 33 ft, the watershed area is 5.8 square miles, and stores 196 million gallons. The reservoir is mainly surrounded by farmland.
- Raccoon Lake in Raccoon State Park is 100 acres and 45 feet deep, with a storage capacity of 95 million gallons. The drainage area is 19.1 square miles and the detention time is 5.13 days. The lake is mainly used for boating and fishing; swimming facilities include a man-made beach. The watershed is a heavily forested.
- The 368-acre Ambridge Reservoir on Service Creek, Beaver Co, owned by the Ambridge Water Authority and used as a public water supply, is not open to the public for recreational use. The watershed is predominantly forested with small areas of housing and farmland.

Chapter 93 designated Exceptional Value (EV) and High Quality Streams (HQ):

- EV: None
- HQ: Cross Creek, source to Avella water intake

Water Quality Impairment
The major impairment in the Raccoon Creek watershed is abandoned mine drainage (AMD). Over 200 mine sites and 10,000 acres of surface mined lands are located in the watershed. Forty miles of main stem Raccoon Creek and 30 to 40 miles of tributaries are degraded by AMD. Discharges are either highly alkaline or acidic; both types have very high concentrations of iron. Extensive impairment from abandoned deep mines is found in the Cherry Valley, Joffre and Burgettstown areas. Extensive limestone strata result in high base flow alkalinity. The major impairments, therefore, are iron hydroxide precipitate and sediment. Harmon Creek and Cross Creek are also impaired by metals and suspended solids from abandoned mine drainage.

The Burgettstown area is impacted by sewage from faulty on-lot septic systems. Many individual water wells sources have some nitrate impairments (6 to 10 ppm) and a significant coliform bacteria problem.

Monitoring/Evaluation
Agricultural Nonpoint Source Watershed Evaluation for the Raccoon Creek and Cross Creek Watersheds in Southwestern Pennsylvania, prepared by the Washington County CD, June 1993-1994; 205j5 funding under DEP BLWC. The Raccoon Creek watershed was prioritized for agriculture restoration needs based on farm management practices, groundwater delivery, animal

nutrient index, watershed delivery factor, and actual farmer interviews. Urban needs were not factored in this prioritization.

Several WQ studies have been done on Raccoon Creek:

- 1968 US Department of Interior, Federal Water Pollution Control Administration: Sources of coal mine drainage pollution. At that time, approximately 40 miles of Raccoon Creek and 40 to 50 miles of tributaries were affected by mine drainage.
- The Washington County Conservation District sampled streams for various water quality parameters for approximately 9 months in 1993-94 under an EPA 205j grant. High nitrate readings were observed in various subwatersheds, mostly in the late fall, due to excessive manure spreading. Low DO readings were recorded in the month of August in several subwatershed locations and at the headwaters of the lakes, due to extremely low flows. No problems with phosphates were detected; however, the samples were analyzed using field test kits which are not sensitive below 0.5ppm.
    - DEP Bureau of Mining and Reclamation (BMR) biologists evaluated the effects of mine drainage on aquatic life of Raccoon Creek in 1983.

Future threats to water quality

Present point and nonpoint pollution sources, such as open and abandoned mines, gob piles, agriculture, malfunctioning on-lot septic systems, and municipal waste, will continue to be a threat in the future. Municipal waste problems will continue to increase with the continued population growth. Although some improvements have been made with regard to AMD, a great deal of improvement is still needed to alleviate the AMD problem.

Restoration Initiatives

Pennsylvania Growing Greener Grants:

- $400,000 (FY2003) to Stream Restoration Inc. - to construct a passive treatment system in the Raccoon Creek Watershed.
- $2,000 (FY2001) to the Washington County Watershed Alliance for establishment of a monitoring program on Raccoon Creek.
- $21,520 (FY2000) to the Cross Creek Watershed Association for an assessment of nonpoint source pollution problems in watershed and development of a watershed restoration and protection plan for the 63 square mile Cross Creek Watershed.
- $180,000 (2000) to Greene Township to reclaim a former coal wash plant site that will include removal of dilapidated buildings and equipment, remining of waste coal piles, treatment of excessive iron with a passive treatment system, replanting 80 acres of watershed land, and stabilizing remaining valley fill material. Funding will restore 2 miles of Peggs Run.
- $30,000 (1999) to Washington County Alliance for assessment of Raccoon Creek, Cross Creek, Chartiers Creek, and Pike Run to complement a similar assessment underway in the Allegheny County portion of these watersheds.

US EPA Clean Water Act Section 319 Grants:

- $142,800 (2001) to the Washington County Watershed Alliance to provide additional funding for construction of the AMD passive treatment system for the JB#2 discharge.

- $200,000 (2001) to the Washington County Conservation District to fund a NRCS EQIP project consisting of BMPs to restore the riparian corridor and reduce agricultural nonpoint source pollution in the Raccoon Creek watershed.
- $80,000 grant (1999) to Washington CD for remediation of the JB #2 deep mine which discharges acidic, high iron water to the headwaters of Raccoon Creek. The discharge generates 12 tons of iron per year. A passive treatment system consisting of a vertical flow wetland (SAPS) and settling basin will be installed. Total project costs will be $280,000. Additional funding and in-kind services will be provided by:
  - $1,500 from DEP BMR for water quality monitoring
  - $8,000 from NRCS and DEP BAMR for design and engineering services
  - $5,000 from Washington County Conservation District for administration of project
  - $18,000 from the Raccoon Creek Watershed Association for property acquisition
  - $100,000 from Penn's Corner Conservancy Charitable Trust for construction.
  - Additional funding for construction will be requested from OSM through the Appalachian Clean Streams Initiative.

Western PA Coalition for Abandoned Mine Reclamation (WPCAMR):

- Washington County CD received a grant for passive treatment of the Langeloth Borehole mine discharge located near Burgettstown. Total treatment costs were $91,381. Partners included DEP Greensburg District Mining Office, Bologna Coal Co., Western PA Conservancy, NRCS, and the Washington County Commissioners. This highly alkaline, high iron discharge is treated with a settling basin and aerobic wetlands.

DEP Bureau of Abandoned Mine Reclamation (BAMR) 10% Set-Aside Program:

- DEP BAMR received a request from the PA Fish and Boat Commission to investigate mine discharges impacting 6 miles of Cross Creek for possible passive treatment. They determined that reclamation of the entire site was beyond the means of the set-aside program. The US Army Corps of Engineers completed a preliminary restoration plan and has started an in-depth ecosystem restoration study.
- DEP BAMR has done some surface reclamation work in Raccoon Creek watershed through its bond forfeiture program.

DEP Bureau of Mining and Reclamation:

- US EPA 104b3 grant: $30,640, to the Washington County Watershed Alliance to conduct a watershed survey and develop a preliminary restoration plan. Skelly & Loy engineering will complete the study.
- Mine inspectors from the Greensburg District Mining Office (DMO) have been involved in cleaning up mine discharges in Raccoon Creek watershed through their compliance program for active mine permit areas. All of the discharges with responsible parties have been addressed through these efforts. Mine Inspector John Davidson has monitored discharges in the watershed for possible future remediation.
- The Greensburg DMO is pursuing remediation of the Hamilton discharge which discharges into Potato Garden Run in Allegheny County. The watershed association and its partners and the Pennsylvania Turnpike Commission are also participating in restoration of this site.

US Natural Resource Conservation Service (NRCS):

- The Somerset NRCS Technical Office assisted the Washington County CD in developing a comprehensive inventory of the mine discharges in the Burgetts Fork watershed. DEP BAMR and BMR, WPCAMR, and Penns Corner RC&D assisted these efforts. They assisted

in design of the Langeloth Borehole treatment system and will assist in the design of the next discharge downstream of the Erie mine.

Agricultural Initiatives:

- (EPA) 205j Grant: An assessment of agricultural nonpoint source pollution in Raccoon Creek watershed was conducted in 1993-4 by the Washington County Conservation District.
- The Raccoon Creek watershed is one of the most concentrated agricultural production areas in Washington County. Intensive rotational grazing is a successful nutrient management practice that is widely used with the dairy and beef livestock operations found here. Fy94 through FY97 grants provided funding for a nutrient management technician to provide technical and financial assistance to farmers. The Washington County CD has started a Geographic Information System to coordinate all agricultural and land-use data for the county; GIS mapping was started with funds from this project. Nutrient Management Act (Act 6 of 1993) funds have continued the effort in this watershed.
- Soil conservation practices have slowed agricultural related erosion.
- Nutrient management planning has helped farmers better utilize livestock manure, clean up barnyard problems, and use forage crops to help reduce cultivated crop production on steep slopes.

Water Supply Protection/Sewage/Stormwater:

- The 1999 installation of a new sewage system in Burgettstown, Slovan, and Atlasburg areas by the Burgettstown Sewage Authority eliminated a long-term source of pollution.
- PA Infrastructure Investment Authority:
  - $3.25 million loan (1997) to the Pennsylvania American Water Co. to install 13 miles of transmission and distribution lines for water service to Independence and Hopewell Townships, West Middletown Borough, and Cedar Grove water system customers. Households were using contaminated wells or an inadequate supply from Avella.
  - $302,100 to Center Township Sewer Authority to eliminate malfunctioning on-lot septic systems and raw sewage discharges (1997).
  - $67,875 to Allegheny County for preparation of a watershed stormwater plan to address runoff from new development sites (1994-5).
- Department of Community & Economic Development Communities Facilities Program:
  - $75,000 grant to Center Township Sewer Authority for sewer improvements.
- Water Supply Planing & Wellhead Protection Program:
  - $19,500 (1995) to Raccoon Township to study their water supply system.
  - $78,000 (1995) to Beaver County to develop a wellhead protection program.

Public Outreach

Watershed Notebooks

DEP's website has a watershed notebook for each of its 104 State Water Plan watersheds. Each notebook provides a brief description of the watershed with supporting data and information on agency and citizen group activities. Each notebook is organized to allow networking by watershed groups and others by providing access to send and post information about projects and activities underway in the watershed. This WRAS will be posted in the watershed notebook to allow for public comment and update. The notebooks also link to the Department's Watershed Idea Exchange, an open forum to discuss watershed issues. The website is www.dep.state.pa.us. Choose Subjects/Water Management/Watershed Conservation/Watershed and Nonpoint Source Management/Watershed Notebooks.

Citizen/Conservation Groups

- Washington County Watershed Alliance was formed as a coalition of concerned citizens whose interest is to upgrade the quality of all watersheds in Washington County. Penn's Corner Conservancy Charitable Trust has dedicated $100,000 towards remediation of mine drainage in Raccoon Creek watershed. Funds will be used for acquisition of property rights, site surveys, design of treatment facilities, and other associated construction costs.
- Raccoon Creek Watershed Association was formed in 1998. Membership is restricted to landowners or those living in the watershed and citizens or conservation groups actively involved in the watershed. The association is developing a management plan for remediation of mine drainage discharges in Raccoon Creek watershed. Assistance in developing the plan was provided by Skelly & Loy consultants. The restoration plan will be completed by fall 2000.
- Western Pennsylvania Conservancy
- Penn's Corner Conservancy Charitable Trust
- Penn's Corner RC&D
- Washington County Groundwater Coalition

Funding Needs

Restoration of Raccoon Creek will be difficult and challenging. The high number of coal mine discharges and abandoned surface mines in the watershed will make it impossible to treat every discharge and to restore the creek to water quality standards. The goal is to treat the major discharges and to restore most of the watershed so that it will sustain aquatic life. The major AMD discharge is the 1,500 gpm JB#1, which accounts for 50% of the AMD affecting the watershed. DEP BAMR will address treatment of this discharge. Treatment of JB#2 will reduce the amount of iron in the watershed by 12 tons. The citizens groups, DEP, and the conservation district will direct the restoration efforts.

The total dollars needed for addressing all nonpoint source problems in the watershed is will be better estimated after stream assessments are completed and necessary TMDL's are developed for the watershed. However, existing programs that address nonpoint source issues in the watershed will continue to move forward. TMDL development is scheduled for 2000 for Burgetts Fork, Raccoon Creek, and Potato Garden Run; Harmon Creek is scheduled for 2001.

Pennsylvania has developed a Unified Watershed Assessment to identify priority watersheds needing restoration. Pennsylvania has worked cooperatively with agencies, organizations and the public to define watershed restoration priorities. The Commonwealth initiated a public participation process for the unified assessment and procedures for setting watershed priorities. Pennsylvania's assessment process was published in the *Pennsylvania Bulletin, DEP Update* publication and World Wide Web site. It was sent to the Department's list of watershed groups, monitoring groups, and Nonpoint Source Program mailing list. Department staff engaged in a significant outreach effort which included 23 additional events to solicit public comment. The Department received 23 written comments from a variety of agencies, conservation districts and watershed groups. Pennsylvania is committed to expanding and improving this process in the future.

After development of the initial WRAS a public participation process will take place to incorporate public input into expanding and "fine tuning" the WRAS for direction on use of 319 grant funds beyond FY2000.

References/Sources of information

- State Water Plan, Subbasin 20, Ohio River. Department of Environmental Protection, January 1983
- USGS Topographic Maps
- 319 project proposals and summaries
- DEP: Watershed Notebooks, Unified Assessment Document, and information from files and databases.
- Map of Draft Level III and IV Ecoregions of Pennsylvania and the Blue Ridge Mountains, Ridge and Valley, and Central Appalachians of EPA Regions III
- Agriculture Nonpoint Source Watershed Assessment for Raccoon Creek Watershed. Washington County Conservation District. 1994
- US Department of Interior, Federal Water Pollution Control Administration: Sources of coal mine drainage pollution. 1968

Streams in Subbasin 20D: 303d/305b Listings

Stream	**Stream Code**	**Drainage area square miles**	**Miles Impaired**	**Miles Attained**	**Causes/Sources/ *Comments***
1-**Ohio River**	32317		7.26		Fish consumption advisory due to PCB
2-**Raccoon Creek**	33564	184	30.57 main stem	3.18	Metals and suspended solids from AMD
3-Cherry Run	33904	3.07			
3-Burgetts Fork	33846	18.3	16.82		Metals and suspended solids from AMD
3-Little Raccoon Run	33804	15.6		6.419	
4-St Patrick Run	33806	4.64		0.75	
3-Brush Run	33786	6.33			
3-Potato Garden Run	33756	9.85	3.75 main stem; 0.81 one UNT		Metals from AMD
3-Diloe Run	33780	2.18			
3-Bigger Run	33778	1.87			
3-Wingfield Run	33770	2.77			
3-Traverse Creek	33702	20.6		1.09 one UNT	
4-Little Service Run	33721	4.96		0.61	
3-Little Traverse Creek	33680	7.40			
3-Raredon Run	33635	9.52		1.5	
3-Service Creek	33592	17.7			
3-Trampmill Run	33583	3.78		3.52	
3-Gums Run	33574	1.55			
3-Fishpot Run	33566	2.13			
2-Fourmile Run	33559	2.28			
2-Sixmile Run	33539	9.01			
2-Wolf Run	33529	4.99			
2-Haden Run	33523	2.31			
2-Peggs Run	33515	3.87			
2-Upper Dry Run	33502	5.71			
3-McLaughlin Run	33509	1.64			
2-Mill Creek	33721	15.5			
3-Little Blue Run	33272	3.08		1.37	
2-(Tomlinson Run, WV)					

3-South Fork Tomlinson Run	33237	3.35			
2-**Kings Creek**	33146	32.0		3.23	
3-Aunt Clara Fork Kings Creek	33181	14.2			
3-North Fork Kings Creek	33147	7.27			
4-Lawrence Run	33159	2.62			
2-Harmon Creek	33112	21.5	4.3 main stem; 1.56 one UNT	3.29	Metals and suspended solids from AMD
3-Ward Run	33130	2.96			
3-Paris Run	33117	1.78			
2-Cross Creek	33001	63.0		1.17	*HQ-WWF, upper basin*
3-South Fork Cross Creek	33070	12.3			
3-Haynan Creek	33067	1.38			
3-North Fork Cross Creek	33033	16.3			
3-Middle Fork North Fork Cross Creek	33035	4.62			
3-"Coal Hollow"	33016	2.61			
3-Scott Run	33002	7.26		2.25	

The assessment under the DEP unassessed waters project has not been completed for the subbasin. Total miles impaired will likely change after the subbasin is assessed. The assessment is scheduled for after 1999.

Streams are listed in order from upstream to downstream. A stream with the number 2 is a tributary to a number 1 stream, 3's are tributaries to 2's, etc. Ohio River=1.

Classification in Chapter 93: HQ= High Quality, CWF= Cold Water Fishes, EV= Exceptional Value

UNT= Unnamed tributary, AG= Agriculture, AMD= Abandoned Mine Drainage