Updated 9/2003

Watershed Restoration Action Strategy (WRAS)
State Water Plan Subbasin 19G
Upper Monongahela River Watershed
(Dunkard, Big Sandy, Georges and Whiteley Creeks)
Fayette and Greene Counties

Introduction

This 377-square mile subbasin 19G includes the upper Monongahela River (Mon River), the Cheat River, and their tributaries from the West Virginia line to below the confluence of Whiteley Creek. A total of 954 streams flow through the subbasin. Major subwatersheds are Dunkard Creek 235 square miles, Big Sandy Creek 83.5 square miles, Georges Creek 64.8 square miles, and Whiteley Creek 54.4 square miles. The subbasin is part of **HUC Area 5020005, Lower Monongahela River, HUC Area 5020004, Cheat River, and HUC Area 5020003 Upper Monongahela River**, which are Category I, FY99/2000 Priority watersheds under the Unified Watershed Assessment developed by the Department in 1998.

Geology/Soils

The western half of the subbasin is located in the Western Allegheny Plateau Ecoregion, Permian Hills (70a) and Monongahela Transition Zone 70(b). Ecoregion 70a has few flat areas and is comprised of rounded hills and shallow valleys. The majority of the rocks are of the Greene Formation composed of sequences of sandstone, shale, red beds, limestone and coal. The Washington Formation outcrops along the river valleys and is composed of sandstone, shale, red shale, limestone and coal. Forests are common through this area because most of the land is too steep to be farmed, although some farms use hilltops as pastures. Subsoils are heavy clays and landslips are common. Ecoregion 70b has entrenched rivers and the landscape is less dissected than 70a. Sedimentary rocks of sandstone, shale, limestone and coal of the Waynesburg Formation and Monongahela Group comprise 70b, which include the highly economical Pittsburgh and Waynesburg coals.

The eastern half of the subbasin is in the Central Appalachian Ecoregion, Forested Hills and Mountains (69a) and Uplands and Valleys of Mixed Land Use (69b). These regions are composed of sedimentary sandstone, shale, limestone, and coal of the Pennsylvanian Age, Pottsville and Allegheny Groups and Mississippian Age, Burgoon and Mauch Chunk Formations. Crest elevations in 69a vary from 1500 to 3000 feet, high enough to ensure a short growing season, high rainfall, and extensive forest cover. Cool, steep gradient streams with many waterfalls occur in narrow valleys. Soils in this region are often acidic and of low fertility.

Ecoregion 69b is less rugged than 69a and is underlain by sedimentary rocks and coal bearing strata of the Glenshaw and Conemaugh Formations. Soils are more alkaline in 69b than 69a. Soils throughout the subbasin have moderate to slow infiltration rates. Little limestone surfaces in the subbasin; however, some of the best aquifers for water supplies tap into the thin limestone strata between the noncarbonate rocks. The limestone strata causes much of the groundwater and many of the streams in the subbasin have high to very high alkalinity and hardness. Tributaries originating in the mountains have softer water than the larger valley streams.

Land Use

The subbasin has a combination of forested and agricultural land uses. Most of the agricultural areas extend east and west from the Mon River. Dairy farming and livestock rearing are the main agricultural pursuits in the subbasin. Chestnut Ridge is almost entirely forested. No large urban areas are in the subbasin. The closest urban area is Morgantown, West Virginia. The population of the subbasin was 31,149 in 1990 and is projected to increase slightly to 35,410 by 2040. I-79 and US Route 119 pass through the subbasin.

Bituminous surface mines are common throughout the landscape and deep mines underlie much of the subbasin. The mines in the western half reach down to the valuable Pittsburgh coals, some of which are more than 600 feet underground. These coals are often mined by the longwall method, by which huge rectangular blocks of coal are removed without retaining support pillars. Surface subsidence occurs soon after mining and can deplete the surface water table and streams segments or cause ponding of streams. Subsidence troughs have affected I-79 after undermining. The very deep underground mines often encounter brines. Discharges from these mines are highly alkaline and have high concentrations of sodium, chloride, calcium, and sulfate. The western two-thirds of the subbasin also has extensive deposits of gas.

Natural/Recreational Resources:
Scattered State Game Lands (#223 & 138) and Babcock State Forest are located in the subbasin. Quebec Run in the state forest is the only Exceptional Value (EV) stream. The PA Fish and Boat Commission (PFBC) has designated a 4.2-mile section of Shannon Run from T-339 to SR 2009 as a smallmouth bass catch and release area.

DEP Chapter 93 designated Exceptional Value (EV) and High Quality Streams:
EV:
- Quebec Run

HQ:
- Big Sandy Creek, basin EXCEPT for Quebec Run

Water Quality Impairment
The subbasin is affected by discharges from abandoned surface and deep mines. Discharge characteristics vary from highly alkaline to highly acidic. Five streams, Dooley Creek, Georges Creek, York Run, Mountain Creek, and Cats Run are on the 303d listed due to metals from abandoned mine drainage. The only other 303d listings are for the Mon River for priority organics and pesticides and the Cheat River for pesticides. Both Rivers have a no consumption advisory for white bass.

Leaking on-lot septic systems contribute some raw sewage to streams and groundwater in the subbasin. Sewage discharges have improved in most of the small towns since recent installations of treatment facilities.

Monitoring/Evaluation
The subbasin has not been evaluated under the Department's unassessed waters program. Assessment is scheduled for after 2000.

Whiteley Creek
DEP Bureau of Abandoned Mine Reclamation evaluated a small section of Whiteley Creek near the village of Mapleton for potential reclamation of mine discharges under their 10% set-aside program. The project was not funded because they determined that the discharges were not having a significant impact on Whiteley Creek and therefore, did not meet the criteria of their program. Whiteley Creek is a highly alkaline stream; pH was 7.5 and the alkalinity was 146 mg/l. Warm water species of fish, including smallmouth bass, rainbow darter, and bluegill were found in this area. The discharge at the mine site had a pH of 3.1 and aluminum concentration of 73 mg/l. A joint investigation by DEP Bureau of Watershed Conservation and Bureau of Mining and Reclamation and NRCS in summer 1999 showed presence of aluminum precipitate on exposed rocks in Whiteley Creek downstream of the tributary receiving the high aluminum discharges. Because of the instream aluminum precipitate, the discharge will be passively treated with funding through the EPA Clean Water Act 319 program.

Dunkard Creek

Dunkard Creek is comprised of 150,000 acres straddling West Virginia and Pennsylvania. The creek crosses the state line 18 times in the upper two-thirds of its length. Dunkard Creek has ten NPDES point source discharges, all from sewage treatment plants. The majority of the agricultural land is in the western portion of the watershed, mainly in pasture. Beef cattle and sheep are the main livestock reared in the watershed. Cropland is sparse and scattered throughout the watershed.

Sampling by DEP and PFBC determined that Dunkard Creek sustains good water quality for most of its length except for the lower reaches which are impaired by abandoned mine drainage. The creek supports many species of fish indicative of a warm water fishery. The creek also supports a high diversity of freshwater mussels.

A 6.8-mile section of Dunkard Creek is degraded by abandoned mine drainage (AMD) from upstream of the SR2008 bridge in Taylortown downstream to the mouth. Eight discharges are located around the Taylortown-Bobtown area of the watershed. Waynesburg College has been sampling these discharges. The limestone geology buffers the acidity and lessens the impact of the AMD; however, iron precipitate coats and cements the stream substrate downstream of where the discharges enter. Treatment of these discharges may be difficult because they are close to the creek and generally surrounded by steep slopes. Some of the discharges may need to piped to an area where they can be treated passively. The largest discharge (Site 2) originates from two large deep mine openings located on each side of a small valley near Taylortown. The discharge flows overland for about 100 feet before entering Dunkard Creek. Site 6 discharges acidic water with high concentrations of aluminum into Dunkard Creek near Bobtown. Site 7 discharges acid and aluminum into Dunkard Creek near Newtown. Site 8 located just downstream of site 7, contributes additional acid and iron into the creek. The iron precipitate is so bad downstream of sites 7 & 8 that no invertebrates of fish were found there during a 1998 investigation. Outwashes of acid and aluminum have caused fish kills; the most recent of which was in September 1998.

Future threats to water quality

Future treats should remain the same as those now affecting the watershed. Pollution from mining may decrease as the mines close and discharges are remediated. Wildcat sewage discharges should continue to be upgraded and have a lesser effect on streams.

TMDL's

TMDL's have been completed for the pollutant chlordane on the Mon and Cheat Rivers. The recommendations were that natural attenuation was the best implementation method since chlordane has been banned in the US and no new point sources exist on which to apply controls. The study also recommended continued monitoring of white bass tissue every 5 years. The consumption advisory will remain in place until fish tissue concentrations are below EPA recommended standards.

Restoration Initiatives

Pennsylvania Growing Greener Grant Program:

FY 2003:

- $70,000 to Greene County Conservation District for dump cleanups in the Dunkard Creek Watershed.
- $20,000 to Greene County Watershed Alliance to stabilize stream bank on Ruffs Creek using natural stream design and stream bank fencing
- $3,406,298 to Morgan Township: A 54 project will combine Office of Surface Mining and Growing Greener funds to remove dangerous mine structures, re-grade a refuse pile, and install erosion and sediment controls, thus reclaiming 77 acres of abandoned mine land.
- $46,884 to Sustaining Greene County - to implement a woodlot management plan in the Dunkard Creek Watershed.

- $58,497 (FY2000) to the Greene County Conservation District for the cleanup of an 45,000 square foot illegal dump site, containing 300 truckloads of debris along steep banks of Dunkard Creek. The area will be seeded and mulched after cleanup is completed.
- $21,000 (2000) to the Greene County Conservation District to research and evaluate available deep mine maps, install weirs on the priority abandoned mine discharges, conduct monthly water monitoring for a year at 9 locations and analyze the data. This project is an important and necessary first step in addressing 7 discharges and cleaning up 6.2 miles of Dunkard Creek.
- $201,076 (2000) to Fairchance Borough for the stormwater BMP portion of an overall stormwater management project for the town of Glass Factory, located in Georges Creek watershed.
- $5,000 (2000) to the Georges Creek Clearwater Cooperative Initiative for formation of the Georges Creek Clearwater Cooperative Initiative. This grassroots group will start up by getting 501(c)3 status, making educational outreach efforts through photographs, brochures and public meetings to protect the water quality of the Georges Creek watershed.
- $75,000 (2000) to the Georges Creek Clearwater Cooperative Initiative to conduct a watershed assessment of Georges Creek. The project will consist of a survey of pollution sources, sampling of 54 locations for one year, and development of a report on water quality and ways to address pollution. They will provide report copies to every governmental official within the watershed and provide other educational outreach activities.
- $14,382 (2000) to Fayette Forward for a demonstration/education project in Forbes State Forest to show best management practices in forest and timber management to enhance and protect other forest values such as water, flora, fauna, recreation and aesthetics.

US EPA Clean Water Act Section 319 Grants:

- $106,700 (2001) to Greene County Conservation District for installation of agricultural best management practices (BMPs) in Dunkard Creek watershed. BMPs will include streambank fencing, stabilized agricultural crossings, livestock watering facilities, pasture and hayland plantings, heavy use area protection, timber stand improvements, and wildlife habitat management. NRCS will provide technical guidance for this project. This project will implement recommendations in the DCNR Rivers Conservation Plan.
- $53,794 (2000) to Greene County Conservation District for restoration of an abandoned surface and deep mine discharge with elevated aluminum to Whiteley Creek. This project is part of a watershed restoration initiative for Whiteley Creek.

Western PA Coalition for Abandoned Mine Reclamation (WPCAMR) Grants:

- $53,780 to reclaim 6.2 acres of abandoned mine lands in Nicholson Township, Fayette County.
- $123,870 to reclaim 18 acres of abandoned mine land in Springhill Township, Fayette County.

DCNR Rivers Conservation Grant

- $14,200 (1995) to Greene County for development of a comprehensive watershed plan for Dunkard Creek. Dunkard Creek flows in and out of Pennsylvania and West Virginia; twenty-three miles are in PA. A 4.2-mile stretch was designated as one of PA's first catch and release smallmouth bass fisheries.

Pennsylvania Watershed Restoration Assistance Program (WRAP):

- $23,275 grant to Greater Pittsburgh Council, BSA, for the upper reaches of Little Sandy Creek Watershed Protection and Awareness Program. This project will continue the monitoring on Little Sandy Creek and Lake Courage to identify and implement appropriate BMP's. An educational slide show will also be developed.

DEP Bureau of Abandoned Mine Reclamation

- FY 2003) $600,000 to Dunkard Township to use 10 percent mining set-aside funds to pump the Shannopin Deep Mine pool and construct a treatment facility for about 3,500 GPM of mine water.

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

- Dunkard Creek Watershed Association was formed in 1995 to recognize and solve problems common to communities in the Dunkard Creek watershed. The group is headquartered at the Mason-Dixon Historical Park.
- Penn's Corner Conservancy Charitable Trust
- Partners for Wildlife
- Izaak Walton League, Greene County Chapter

Funding Needs

The total needed dollars for addressing all nonpoint source problems in the watershed is undetermined at this time and will be so until stream assessments are completed and necessary TMDLs are developed for the watershed. However, existing programs that address nonpoint source issues in the watershed will continue to move forward.

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.

Restoration Needs for Dunkard Creek:

The Rivers Conservation Plan for Dunkard Creek identified 5 categories of management options for the watershed:

1. Mine drainage treatment options: The expected sequence of treatment is site 4, site 2A-2B, site 7-8, site 6, site 5 and site 1. Remediation will be pursued annually as funds become available.
    - Site 2A-2B: Pipe discharge across Dunkard Creek to where a passive treatment system can be constructed. Average flow is 347 gpm. Estimated treatment cost is $870,500
    - Site 4: Pipe discharge to an area where a passive treatment system can be constructed. Average flow is 162 gpm. Estimated treatment cost is $604,000.

- Site 6: Pipe discharge along Dunkard Creek and across SR2012 to where a passive treatment system can be constructed. Average flow is 147 gpm. Estimated treatment cost is $294,000.
- Site 1 Pipe discharge to an area where a passive treatment system can be constructed. Estimated treatment cost is $80,000. This site was recently backfilled by DEP BAMR and is no longer discharging into the creek.
- Sites 7 & 8: Pipe discharge along Dunkard Creek and across SR2011 to where a passive treatment system can be constructed. Average flow is 207 gpm for site 7 and 97 for site 8. Estimated treatment cost is $491,000.

2. Illegal trash dumps: Three large roadside dumps along Dunkard Creek around Bobtown will need to be removed. Since the dumps are located on steep hillsides, heavy equipment will be needed to remove them. Estimated costs of dump removal are $200,000. An education program will be developed and municipalities will be contacted about sponsoring annual clean up days to alleviate dumping.
3. Erosion and sedimentation: Natural erosion has been accelerated by livestock operations in the upper watershed. BMP's such as streambank fencing, agricultural crossings, and riparian buffers should be implemented to reduce erosion. Education/awareness programs will be begun. Erosion and runoff from dirt and gravel roads is also a major contributor of sedimentation to the watershed. About 130 miles of dirt roads wind through steep ridges and valleys in the watershed. The Greene County Conservation District should increase implementation of their program to reduce gravel road runoff.
4. Raw sewage: An investigation of faulty on-lot septic systems and their effects on streams should be conducted.
5. Promote awareness of the watershed through float trips, wildflower walks, and other field trips; set up a web site. Dunkard Creek Watershed Association will sponsor these events.

References/Sources of information

- State Water Plan, Subbasin 19, Monongahela River. Department of Environmental Protection, July 1982
- 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
- Rivers Conservation Plan for the Dunkard Creek Watershed. Greene County Conservation District. Funded by DCNR. 1999

Streams in Subbasin 19G: 303d/305b Listings

Stream	Stream Code	Drainage area square miles	Miles Impaired	Miles Attained	Causes/Sources
2-**Monongahela River**	37185		5.84		Priority organics & pesticides, Source unknown
3-Crooked Run	42096	7.09			
3-Camp Run	42094	2.86			
3-Cheat River	41885		3.56		Pesticides, source unknown
4-**Big Sandy Creek**	41913	83.5			*HQ-CWF*
5-Braddock Run	42088	1.32			*HQ-CWF*
5-Chaney Run	42081	3.19			*HQ-CWF*
5-Scotts Run	42077	1.26			*HQ-CWF*
5-McIntire Run	42071	3.27			*HQ-CWF*
5-Stony Fork	42050	8.22			*HQ-CWF*
5-Quebec Run	42029	14.4			*EV*
6-Mill Run	42031	10.0			*HQ-CWF*
7-Laurel Run near Elliotsville	42034	2.96			*HQ-CWF*
7-Long Run	42033	1.34			*HQ-CWF*
5-Little Sandy Creek	41937	27.5			*HQ-CWF*
6-Fike Run	41990	12.4			*HQ-CWF*
5-Laurel Run near Laurel Run, MD	41914	4.12			*HQ-CWF*
6-Patterson Run	41931	1.92			*HQ-CWF*
4-Rubles Run	41897	11.1			
5-“Dragoo Hollow”	41905	1.95			
5-“Ryan Hollow”	41900	1.79			
4-Grassy Run	41891	6.54			
4-“Hope Hollow”	41886	1.85			
3-**Dunkard Creek**	41420	235		1.71	
4-Pennsylvania Fork Dunkard Creek	41805	38.0			
5-Brushy Fork White Creek	41864	1.86			
5-Garrison Fork	41849	6.52		2.15	
6-Bloody Run	41855	2.14			
5-Pumpkin Run	41843	1.46			
5-Clawson Run	41840	1.16		2.01	
5-Toms Run	41806	17.7		3.34	
6-Blockhouse Run	41812	8.47			
7- Roberts Run at Pine Bank					

4-(West Virginia Fork Dunkard Creek, MD)					
4-Hoovers Run	41724	11.4		2.54	
5-Tustin Run	41739	2.06			
5-Bells Run	41733	2.08			
5-Bulldog Run	41728	1.27			
4-Morris Run	41720	1.17			
4-Roberts Run at Blacksville	41625	12.3			
5-Calico Run	41642	2.24			
5-Rush Run	41628	1.73			
4-Rudolf Run	41561	10.2			
5-Sharp Run	41570	1.59			
4-Hackelbender Run	41558	2.08			
4-Shannon Run	41488	9.87		1.07	
5-Fox Run	41493	1.75			
5-Little Shannon Run	41489	2.40			
4-Bacon Run	41487	1.10			
4-Calvin Run	41468	5.70		1.76	
5-North Branch Calvin Run	41470	1.73			
4-Dooley Run	41465	1.77		2.28	Metals from AMD
4-Glade Run	41461	1.49			
4-Meadow Run	41443	7.75			
5-Bell Run	41447	1.44			
5-Roberts Run at Davistown	41446	1.07			
4-“Mundell Hollow”	41428	2.06			
4- “Rocky Hollow”	41421	1.49			
3-**Georges Creek**	41340	64.8	1.18	2.38	Metals from AMD
4-Muddy Run	41408	6.06			
4- “Cave Hollow”	41412	2.04			
4-Mountain Creek	41384	16.7	4.54		Metals from AMD
5-“Bartons Hollow”	41396	3.92			
5-“Brownfield Hollow”	41389	6.26			
4-York Run	41360	17.1	1.32		Metals from AMD
4-War Branch	41350	1.56			
3-Jacobs Run		7.50			
3-Cats Run		4.11	1.61		Metals from AMD
3-**Whiteley Creek**	41178	54.4			
4-Patterson Run	41299	2.91			
4-Dyers Fork	41261	9.76			
5-Mt. Phoebe Run	41268	1.63			
4-Dutch Run	41246	3.89			

4-Frosty Run	41227	4.76			
4-Woods Run	41221	1.33			
4-Minor Run	41211	2.66			
3-Little Whiteley Creek	41155	9.03			
4-Goose Run	41164	3.23			

The miles listed in this table as impaired or attained are from older 303d/305b reports. The watershed has not been assessed under the unassessed waters program; assessment is scheduled for after 2000. The total miles impaired are likely to change after the assessment is completed.

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, AMD= Abandoned Mine Drainage