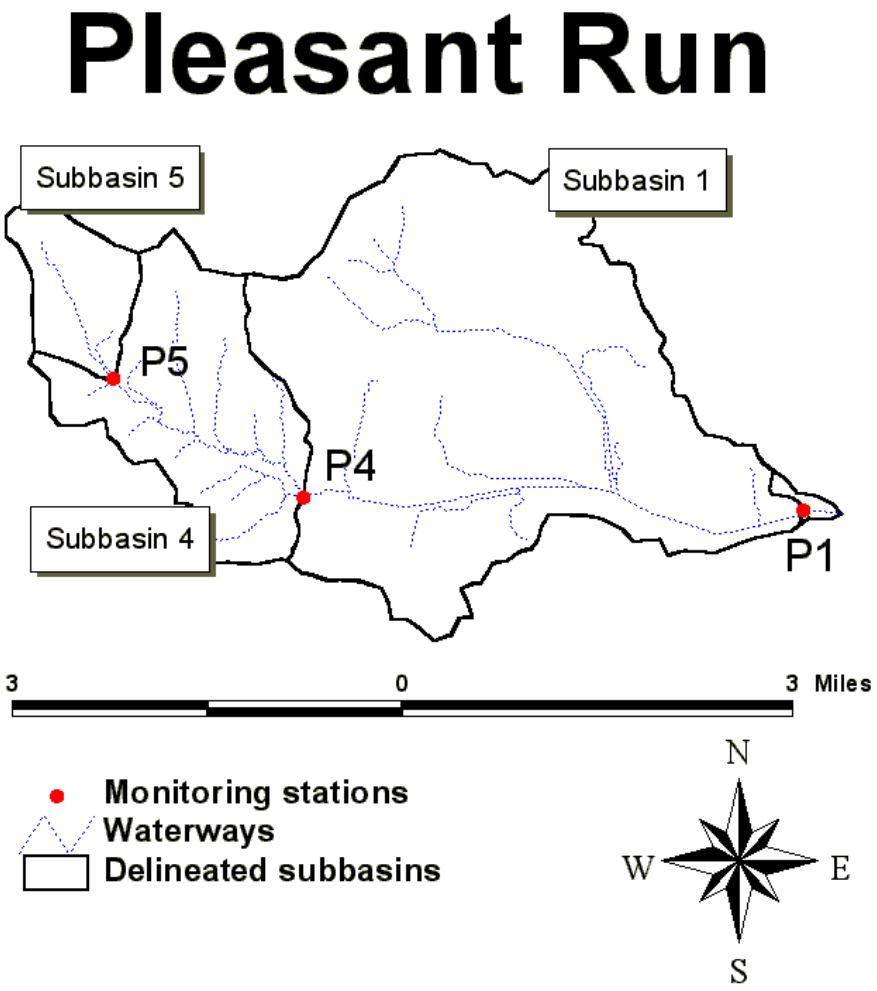
Pleasant Run, Kentucky

TMDL Fact Sheet

Project Name:	Pleasant Run
Location:	Hopkins County, Kentucky
Scope/Size:	Pleasant Run, watershed 8054.5 acres (12.59 mi^2) The listed segment is from river mile 0.0 to 7.9.
Land Type:	Forest, agricultural, barren/spoil
Type of Activity:	Acid Mine Drainage (AMD) caused by Strip/Abandoned Mines
Pollutant(s):	**H^+ Ion mass,** Sulfuric Acid
TMDL Issues:	Non-point sources
Water Quality Standard/Target:	pH shall not be less than six (6.0) or more than nine (9.0) and shall not fluctuate more than one and zero-tenths (1.0) pH unit over a 24-hour period. This standard is found within regulation 401 KAR 5:031.
Data Sources:	KPDES Permit Historical Sampling Data, Murray State University Sampling Data
Control Measures:	Kentucky non-point source TMDL implementation plan, Kentucky Watershed Framework
Summary:	Pleasant Run was determined as not supporting the designated uses of primary and secondary contact recreation (swimming and wading), and warm water aquatic habitat (aquatic life). Therefore, the creek was placed on the 1996 and subsequent 303(d) lists for Total Maximum Daily Load (TMDL) development. The creek segment is characterized by a depressed pH, the result of acid mine drainage from strip and abandoned mining sites. The period of lowest pH is at low-flow conditions; however, the period of greatest hydrogen ion load has been determined at a critical flow condition for selected subbasins of Pleasant Run. For pH violations on such streams, the Kentucky DOW has determined that maximum

daily mean flow having a 3-year exceedance frequency be used for setting the appropriate TMDL and associated loading reduction. However, for this TMDL the critical flow was defined from the observed data. This flow will be used for this TMDL.



TMDL Development: Total maximum daily loads in grams H^+ ions per day were computed based on the allowable minimum pH value (6.0) for creeks and streams with recreation and aquatic life designated uses. The TMDL was calculated for grams of ions (subsequently converted to pounds per day) because the units for pH do not allow for the computation of a quantitatively useful load or reduction amount.

Total TMDL for Pleasant Run = 0.207 lbs H+ Ions/day				
	Critical Incremental Flow Rate (cfs)	Incremental TMDL for a pH of 6.0 (lbs/day)	Predicted Maximum Incremental Load (lbs/day)	Incremental Reduction Needed (lbs/day)
Subbasin 1	29.30	0.178	39.69	39.52
Subbasin 4	3.40	0.020	64.76	64.74
Subbasin 5	1.30	0.008	24.76	24.75
Total	34.00	0.207	129.22	129.01

Permitting in the Pleasant Run Watershed: All of the streams in the watershed are considered to be impaired for low pH based on the available data.

New and Reissued Permits: New permits (except for new remining permits) and reissued permits for discharges to streams in the Pleasant Run Watershed could be allowed anywhere in the watershed, contingent upon the end-of-pipe pH being permitted at a range of 7.0 to 9.0 standard units. Water quality standards state that for meeting the designated uses of aquatic life and swimming, the pH value should not be less than 6.0, nor greater than 9.0. This range of 6.0 to 9.0 for pH is generally the value assigned for end-of-pipe effluent limits. However, because a stream impairment exists (low pH), new discharges can not cause or contribute to an existing impairment. A pH of 7.0 represents a neutral state between an acidic and a non-acidic condition. As such, a discharge having a pH of 7.0 to 9.0 standard units will not cause or contribute to the existing impairment. The discharge will not cause an impairment because the effluent discharge has a pH greater than 6.0 standard units. The discharge will not contribute to the existing impairment because a pH of 7.0 represents a neutral condition with respect to acidity and effectively represents a background condition. The hydrogen ion load associated with a pH of 7.0 is insignificant (effectively zero) and therefore does not represent a contribution to the existing impairment. As such, new permits and reissued permits specifying an effluent limit pH of 7.0 to 9.0 would not be assigned a hydrogen ion load as part of a Waste Load Allocation.

There is only one active Kentucky Pollutant Discharge Elimination System (KPDES) permit in the Pleasant Run Watershed. The permit (KY0067121) is issued to Charolais Corporation. Mining has not been initiated under this permit. The KPDES permit includes an outfall that will receive flow from a disturbed area of 5 acres. The discharge from the permitted outfall will enter an unnamed tributary to Pleasant Run that drains to the site at P4. Because mining has not been initiated, there is currently not a discharge from the outfall that is defined in the permit. The KPDES permit will expire on May 31, 2005. At the time of reissuance of the KPDES permit, any discharge points draining to streams in the Pleasant Run Watershed would need to meet the criteria for new and reissued permits as described previously (an end-of-pipe pH of 7.0 to 9.0).

Remining Permits:

New remining permits may be approved on a case-by-case basis where streams are impaired because of low pH from abandoned mines. Permit approval is contingent on reclamation of the site after remining activities are completed. During remining, existing conditions of the water coming from the site must be maintained or improved. Reclamation of the site is the ultimate goal, but water quality standards (pH of 6.0 to 9.0 standard units) may not necessarily be met in the interim if the Commonwealth issues a variance to the discharger as defined by 401 Kentucky Administrative Regulation (KAR) 5:029. In instances where the Commonwealth issues a variance for a remining activity consistent with this regulation, hydrogen ion loads from this remining activity are allowed to exceed the waste load allocation. The variance allows an exception to the applicable water quality standard as well as the TMDL. Remining therefore constitutes a means whereby a previously disturbed and unreclaimed area can be reclaimed. The authority for remining is defined in Section 301(p) of the Federal Clean Water Act; Chapter 33, Section 1331(p) of the U.S. Code – Annotated (the Rahall Amendment to the Federal Clean Water Act); and the Kentucky Administrative Regulations (401 KAR 5:029 and 5:040). The eventual reclamation of the remining site should result in a reduction of the overall ion load (specifically the nonpoint source load) of the subbasin where the remining was done. The reclamation should therefore result in an improved stream condition (increased pH) because a previously disturbed unreclaimed

area will be reclaimed. Follow-up, in-stream monitoring would need to be done at the subbasin outfall to determine the effect of reclamation activities (following remining) on the overall ion load coming from the subbasin. This constitutes a phased TMDL, where a remedial measure (reclamation at the end of remining) would then need to be followed by in-stream monitoring to see how well the remedial measure did in improving the low pH condition for that subbasin. There are currently no active remining permits in the Pleasant Run watershed.

Distribution of Load: Because there were no point source discharges during the study period (and at this time there are still no point source discharges, but one has been permitted), the existing Hydrogen Ion load for the watershed was defined entirely as a load allocation and that is what is reflected in the TMDL table. Because new permits (pH 7.0 to 9.0) would not cause or contribute to the existing impairment and remining permits would be exempt from the TMDL requirements, no load has been provided for the waste load allocation category. Therefore, the table below allocates all of the load to the load allocation category. New and reissued permits having a minimum pH effluent limit of 7.0, and new remining permits with modified effluent limits for pH essentially represent no net change in conditions in the subwatershed with respect to pH.

Waste Load and Load Allocation for Each Subbasin in the Pleasant Run Watershed

	Critical Flow Rate (cfs)	TMDL for pH = 6.0 (lbs/day)	Waste Load Allocation (lbs/day)	Load Allocation (lbs/day)
Subbasin 1	29.30	0.178	0.000	0.178
Subbasin 4	3.40	0.020	0.000	0.020
Subbasin 5	1.30	0.008	0.000	0.008

Implementation/ Remediation Strategy: Remediation of pH-impaired streams as a result of current mining operations is the responsibility of the mine operator. The Kentucky Division of Field Services of the Kentucky Department of Surface Mining Reclamation and Enforcement (DSMRE) is responsible for enforcing the Surface Mining Control and Reclamation Act of 1977 (SMCRA). No governmental entity bears the responsibility to remediate pH-impaired streams as a result of pre-law mining operations or mining operations associated with

forfeited reclamation bonds. The Kentucky Division of Abandoned Mine Lands (KDAML) is charged with performing reclamation to address the impacts from pre-law mine sites in accordance with priorities established in SMCRA. SMCRA sets environmental problems as third in priority in the list of AML problem types. Just recently, 319 funding (specifically Clean Water Action Plan funds) has been awarded to the KDAML, which is part of the DSMRE. This grant is the Homestead Refuse Reclamation Project and includes reclamation of most of the area above site P5 that lies to the west of Pleasant Run (the western slope). The project also includes reclamation in the eastern portion of the adjacent watershed to the west of Pleasant Run, which is the Fox Run watershed. Therefore, the project area includes the eastern slope of the upper Fox Creek watershed, the western slope of the Pleasant Run watershed upstream from site P5, and the ridgeline between the two watersheds. The project involves a 92-acre area. The total cost of the reclamation project is $1.26 Million, of which 60% is federal funds and 40% is supplied by the KDAML. The project includes grade work of coal refuse fills to eliminate gullies and redirect drainage. The area will then be capped with an agricultural limestone barrier and 2 feet of top soil and will then be revegetated. This approach is very similar to what was done in the Brier Creek watershed described below. Also, three other AML projects have been performed in the Pleasant Run drainage area: Pleasant Run, Pleasant Run II and Pleasant Run - Area 5. The projects were conducted in 1986 - 1987 at a combined cost of approximately $2.6 million and resulted in the reclamation of 274 acres. The work involved covering coal refuse, grading strip mine spoil, eliminating impoundments, and establishing a vegetated cover for the project areas.

Reclamation activities are also underway at other locations within the state where water quality is affected by acid mine drainage (AMD). The success of the reclamation activities in these watersheds was to be evaluated before developing remediation strategies for other watersheds affected by AMD. The KDAML developed a reclamation project in response to documented sedimentation and flooding problems in the nearby Brier Creek Watershed. The project included reclamation of approximately 120 acres of barren or poorly vegetated areas affected by past strip mining. The project also entailed six acres of channel

restoration to minimize sedimentation caused by erosion. The restoration of streams included construction of ditches and PVC coated gabion baskets utilized as velocity reducers and energy dissipaters; bale silt checks and silt trap dugouts were also utilized for sediment control. The reclamation project consisted of 67 acres of gradework to remove erosion gullies, redistribute sediment deposits, and prepare a surface to receive a soil cover. The area under consideration received a two foot soil cover layer, taken from 20 acres of watershed area designated for borrow. Gradework areas were treated with an application of agricultural limestone to neutralize acidic conditions and all areas were revegetated using a combination of seedbed preparation, agricultural limestone, fertilizer, seed, mulch, and crimping. The agricultural limestone provided a variety of particle sizes so that it dissolved at different rates and mobilized under a range of flow conditions. The strategy employed at Brier Creek is similar in some respects to a project that is currently underway on Rock Creek and a tributary, White Oak Creek in McCreary County, Kentucky. This 12-acre project is also funded as a Clean Water Action Plan. It involves the removal of coal refuse from the banks of Rock Creek, the establishment of a vegetative cover on other refuse areas in the watershed, and the application of limestone sand at selected locations to neutralize the effects of AMD.

The total cost for the Brier Creek project was $913,000.00 (i.e. $7600/acre) while the total cost of the Rock Creek project is estimated to be approximately $650,000 (i.e. $54,200/acre). For 2000, the total federal KDAML budget allocation was approximately $17 million. However the bulk of these funds were used to support priority 1 (extreme danger of adverse effects to public health, safety, welfare, and property) and priority 2 (adverse effects to public health, safety, and welfare) projects. Based on the cost of current remediation efforts, it would appear that a significant increase in federal funding to AML projects, particularly priority 3 projects, would be required in order for the AML program to play a significant part in meeting the TMDL implementation requirement associated with pH impaired streams in the state of Kentucky.