

RECOMMENDATIONS AND CONCLUSIONS

The investigation into the problems besetting the English Run and adjacent watersheds has brought into sharp focus the increasing difficulties man encounters as he continues to expand his horizons in a never ending search for outdoor recreation and relaxation. Since most of the local watershed deterioration is directly attributable to the very articles of commerce that make his freetime so abundant, man is faced with a very real paradox. Does he, for example, eliminate or restrict mining, lumbering, energy transmission, highway construction, and the like, so that he may enjoy the intrinsic value of the land, or does he continue to enjoy the fruits of progress and look elsewhere for his esthetic fulfillment. Stream degradation from acid mine pollution and soil sedimentation is relatively minor throughout the study area; however, the region's reputation for excellence of outdoor recreation makes even the smallest fluctuation in the local environment readily apparent. The existence of coal deposits in the English Center basin presents some interesting complications in as much as those two great natural resources water and coal are rarely, if ever, compatible. Our main natural resource in developing power is water, and quality is as important as quantity, while that other main ingredient of power, coal, invariably will effect the quality of water whenever it is extracted from the earth. Thus a second paradox is encountered in the search for a reasonable solution to the problems of man's environment.

The overall picture of the area revealed by this engineering study is one of a region of moderate to rough terrain pock marked with abandoned drift mine openings at varying elevations, all of which have the potential to emit acid mine water into the regional drainage system. Even though precious few records exist concerning these generally small mining operations, prospect drill records and other physical evidence indicate that they are extensive enough to cause some AMD damage to the smaller fishing streams of the region. In addition, the siliceous nature of the soils and rocks within the watershed also contributes to the generally acid condition found in all the surface and ground waters sampled. In several instances, strip-mining, which has been confined to the central portions of the saucer like coal field, has greatly accelerated drift mine outfall and surface runoff to exaggerate an otherwise negligible mine drainage condition. Two power line rights-of-way recently cut through the region on

critical high ground have exposed great strips of surface area to rainfall and so altered existing drainage patterns as to be an even greater menace to the ecology than the off maligned strip mining industry. Observable changes in two small streams draining exclusively from one of these power lines offers mute evidence of this fact. Many of the access roadways in the project area are poorly constructed and maintained and appear to be a major source of erosion and soil sedimentation. The roadbanks in many areas are in need of stabilization for erosion control. Thus it would seem that the very exposure of the area to development through access roadways, power lines, mining and lumbering, and even to complete timber cutting for browse (under recent attack) on State Game Lands, has caused its general decline in the minds of some.

It would appear that the most serious problem encountered in this watershed study is the abandoned mine. At present several neutralization plants treat the outfall from mines on Pine Run and Buckeye Run and an additional treatment plant (soda-ash) is under consideration for a group of mines draining into the Shingle Mill Branch. Though effective, this technique is prohibitive economically because of the installations necessary, the cost of the neutralizing agent, manpower required, upkeep of equipment, and sludge disposal problems. Of the numerous alternatives available for mine pollution abatement, the mine sealing method would seem to be the best suited in this particular case. With this in mind, the following recommendations are made regarding the abatement of local stream pollution from mine discharges.

1. Continue with the existing program of neutralization as a temporary measure until such time as a workable permanent abatement plan is completed.
2. Improve the present neutralization operations by installing cheaply constructed soda-ash plants or their equivalent.
3. Eliminate completely certain troublesome deep mine workings by stripping them away under amendments to existing or future strip-mine permits granted for the area. Several openings could best be described as marginal with reference to effective treatment by mine sealing.
4. Consider the construction of earthen impounding dams in conjunction with various agencies concerned with other outdoor resource problems related to flood and sediment control, recreation, water supply, and wildlife habitat. Such multi-purpose dams would therefore effectively control mine pollution through inundation, while at the same time fulfilling numerous alternate objectives.

5. Install mine seals by grouting plugs into all known mine entryways and creating a grout curtain for considerable areas surrounding these plugs. Water escaping from such confinement will therefore enter the drainage system at an elevation substantially higher than before and thus be of an improved quality.

Additional recommendations concerning the protection and improvement of the watershed can be listed as follows

6. The introduction of extensive amounts of lime into the spoil areas of abandoned strip mines to insure the growth of any trees, shrubs, or herbaceous plants employed for vegetative stabilization. Liming, fertilizing, or other treatment will be extremely difficult due to the roughness and stoniness of the area but should be attempted.

7. A program of reseedling and replanting should be so designed as to increase the variety of vegetation found in the area to not only improve roadbank, spoil bank, and right-of-way stabilization but to also increase the area's value to wildlife.

8. The installation of limestone barriers or gabions at the headwaters of several streams which seem to be habitually high in sulfur, low in iron, and marginal in acidity. These streams apparently are starved for basic ingredients in this limestone deficient region.

9. An effort should be made to obtain ownership rights to the several thousands of acres in interior holdings that remain in private hands. These lands, located within the confines of the project area, are the location of small deposits of marginal coals. If these coals are permitted to be exploited by surface mining, an additional mine drainage problem will arise.