

Climate

About four-fifths of the surface-mined land is in areas where rainfall and temperatures are adequate for plant growth. With adequate spoil conditions and proper preparation, plant establishment and growth should be possible. On the other one-fifth, plants grow slowly because of too little or too much moisture, high temperatures, or unfavorable evapotranspiration ratio. Here special treatments and plants are needed to offset poor ecological conditions.

Erosion

About 2 million acres have evidence of sheet erosion. Some erosion is inevitable on fresh spoil banks, as it is on any bare soil. How severe it is depends on steepness and length of slope, extent of freezing and thawing, amount and intensity of precipitation, and how water is concentrated on the spoil. Thus, the quicker a plant cover is established to protect against erosion the better.

Forty percent or 1.2 million acres have eroded enough to form rills and small gullies. On 12 percent or 400,000 acres, gullies more than a foot deep have formed: these seem to be associated with long slopes created by grading.

Sheet erosion is not a serious problem in either area stripping or dredging since most of the soil movement is between spoil banks and little leaves the mine area. Sheet erosion is more serious in contour stripping.

Erosion danger is greatly increased at the point where storm water drains from a surface mine because of the concentrated force of water.

Slides.—On about 3,600 miles of slopes left by contour and area stripping (called outslopes), massive slides are a problem—especially where the subsoil is unstable. Slides may enter streams and even block channels. Their stabilization or removal would be costly and would involve geology, soils, engineering, hydrology, and forestry skills. Slides of this size occur on about 10 percent of the total mileage of outslopes.

Access roads.—Mining haul roads are responsible for much erosion, especially in mountain areas. About 1,650 miles of these roads have eroded so badly they need major repairs. Another 3,300 miles are moderately eroded. Access roads for most mines surveyed were under 7 miles in length, and many were of half a mile or less. Many would best be revegetated rather than kept as roads. The rest need careful management after hauling stops.

Plant cover

For newly mined land, the great need is to establish plant cover as quickly as possible. Adequate plant cover reduces erosion and siltation in almost all cases, but it takes time. There is no "instant cover." Examination of sites capable of supporting vegetation showed that 32 percent had plant cover of 40 percent or more. About 28 percent of the sites had less than 40 percent cover at the time but, in the judgment of the survey team, would develop adequate protective cover naturally in time. The other 36 percent of the sites will require seeding, planting, fertilizing, and other attention to develop adequate protective cover.

It was estimated that three-fourths of the vegetation had occurred naturally on ground with more than 10 percent plant cover, and one-fourth through the efforts of man. Variations in vegetation appear to be associated with climatic conditions, spoil characteristics, nearness to natural seed sources, and age of the spoil banks. Half of the banks are less than 10 years old.

Water quality and streamflow

Surface mining in some areas is a source of water pollution, mainly sediment and to a less extent acid. Of the sites surveyed, 56 percent showed no pollution; 23 percent showed some intermittent pollution; and 21 percent produced considerable pollution. The survey team estimated that about a third of the surface-mined land needing conservation treatment, or about 665,000 acres, needs some action to reduce offsite water pollution.

Of the streams receiving direct runoff from surface-mined sites, 31 percent of those examined contained noticeable amounts of mineral precipitates. Water discoloration, suggesting chemical or physical pollution, was noted in 37 percent of the streams. Natural seepage from unworked coal and other pyritic material—from both surface and deep mines—causes limited local pollution. Access roads built of pyritic waste material also may be sources of acid water.

Sediment is a problem where inadequate plant cover permits erosion and water is allowed to run off the site from roads, terrace outlets, outslopes, or slides. It is particularly severe in areas of high-intensity storms and steep slopes.