

Map showing landslides and areas most susceptible to sliding in
Beaver quadrangle and portions of the Beaver Falls and
New Galilee quadrangles, Beaver County, Pennsylvania

John S. Pomeroy

This map is one of a series of selected 1:24,000 scale quadrangles in the Greater Pittsburgh region which identified areas with potential slope stability problems significant to development. The map is based on a smaller scale (1:50,000) map showing only landslides in Beaver County (Pomeroy, 1977a).

Intensive interpretation of 1975 aerial photographs (1:24,000) was supplemented by field reconnaissance in the spring of 1976. The map does not purport to show all recent landslides since most slides are too small to be discerned from the aerial photography. Furthermore, many slopes not designated as containing older landslides undoubtedly include such landslides, but the geomorphic evidence for them has been obliterated by erosion or modified by man.

This map is essentially a guide to areas of past and present landslides activity, and it delineates areas where such detailed studies would be most vital to the general public. It is not intended to replace detailed geological and engineering studies by competent technical personnel where site examinations are necessary in order to determine the degree of difficulty that slope instability may pose to a contemplated land use.

1 Bedrock in this portion of Beaver County includes the Pottsville,
2 Allegheny and Conemaugh Groups of Pennsylvanian age. Soils derived
3 from the red mudstones of the Conemaugh Group are particularly prone
4 to sliding but these soils are prevalent only in the extreme southern
5 and southeastern portions of the Beaver quadrangle. Landslide problems
6 occur in soils of the Conemaugh terrain in southern Beaver County and
7 adjacent Allegheny County (Briggs and others, 1975, Pomeroy and Davies,
8 1975, Pomeroy, 1977a, b). These soils are plastic with a moderate to
9 high shrink-swell potential (U.S. Dept. Agriculture, 1973).

10 Features shown on the map

11 Recent landslides.--Fresh scars characterize the youngest land-
12 slides in the area (see figure). Most slides have been man-generated
13 in that they usually occur in the proximity of roads and construction
14 sites. Landslides smaller than 10 m (33 ft.) in maximum dimension have
15 not been plotted on the map and are best designated as soil slips.

16 Some slopes along the Ohio and Beaver Rivers are particularly
17 prone to rockfalls, and these areas (R) are indicated on the map.

18 The largest recent slide (approximately 200 m long by 120 m wide)(650 ft. by 400 ft.)
19 in the area occurs along the east side of Pa 51 slightly north of the
20 Brady River Park entrance. A large number of slides occur along the
21 road on the west side of Raccoon Creek.

Older landslides.--Most of the designated older landslide areas do not represent single events but are accumulations of landslide deposits that probably occurred during and immediately after Wisconsin glaciation when rainfall intensity was considerably greater than it is presently. Some of the older landslides probably represent movements which might have occurred as late as 50 to 100 years ago. Generally, older landslides form shallow indentations on hillsides which are both concave across slope and downslope. In such areas concentration of ground water is higher than on adjacent slopes and instability is enhanced. Colluvial material along concave slopes is often thicker than 10 m (33 ft) especially in the lower part of the slope.

Definite older landslides are characterized by conspicuous to slightly subdued hummocky and/or bulgy surfaces along the lower slope and a suggestion of a well-defined head scarp.

Erosion has subdued the head scarp and hummocky lower slope of indefinite older landslides.

Most older landslides are stable, but stability is altered often from modification by man and can be reactivated by excavation, loading, and changes in ground-water and surface-water conditions. Higher than normal precipitation during a period of several months or years or increased moisture from unusually heavy rainfalls can reactivate an older slide.

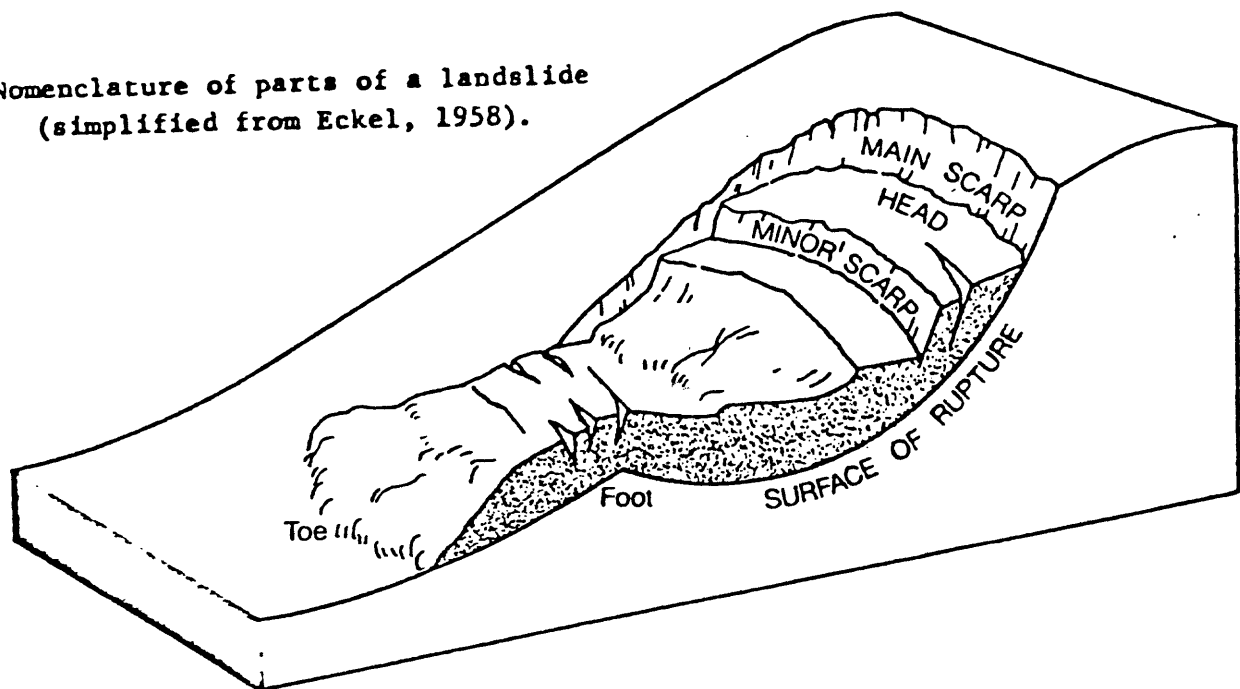
Areas most susceptible to sliding.--The plastic non-red underclays and claystones in the Allegheny Group are susceptible to a loss of shearing strength after being wetted. Areas particularly prone to sliding because of this occur along portions of Brady Run and the Beaver River, and the lower part of Raccoon Creek.

Slides occur along the upper slopes in the extreme southern and southeastern parts of the area which are mantled with widespread unstable red soil derived from the Conemaugh Group. The most serious landslide problems in Beaver County occur south of the map area due to the greater areal extent of the red mudstone horizons in the Conemaugh Group (Pomeroy, 1977 a, b).

References cited

- Briggs, R. P., Pomeroy, J. S., and Davies, W. E., 1975, Landsliding in Allegheny County, Pennsylvania: U.S. Geol. Survey Circ. 728, 18 p.
- Eckel, E. B., ed., 1958, Landslides and engineering practise. Natl. Research Council Highway Research Board Spec. Rept. 29, 232 p. (also available as Natl. Research Council Pub. 544, 1958).
- Pomeroy, J. S., and Davies, W. E., 1975, Map of susceptibility to landsliding, Allegheny County, Pennsylvania: U.S. Geol. Survey Misc. Field Studies Map MF-685 B, 2 sheets w/ text.
- Pomeroy, J. S., 1977a, Preliminary reconnaissance map showing landslides in Beaver County, Pennsylvania: U.S. Geol. Survey open-file rept., no. 77-245, 4 p. 1 pl.
- _____, 1977b, Map showing landslides and slopes most susceptible to sliding in part of the Aliquippa 7 1/2-minute quadrangle, Beaver County, Pa.: U.S. Geol. Survey Open-file Rept., no. 77-832, 7 p., 1 pl., scale 1:24,000.
- U.S. Department of Agriculture, Soil Conservation Service, 1973, Soil interpretations and soil maps for Beaver County, Pennsylvania.

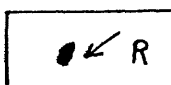
Nomenclature of parts of a landslide
(simplified from Eckel, 1958).



EXPLANATION

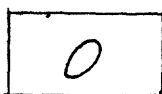
(see text for additional information)

RECENT LANDSLIDES

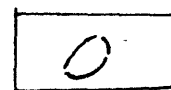


Well-defined, characterized by fresh scars, may still be active. Arrow points to darkened area indicative of a recent slide. R indicates area of rockfall

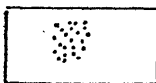
OLDER LANDSLIDES



Definite, boundaries approximate.



Indefinite, fair to poor definition, boundaries inferred.



Areas most susceptible to landsliding

NOTE

Variations in slope sensitivity may occur at any specific point within a unit.

Boundaries largely are inferred and information given is intended as a general guide and should not be construed as applicable to all localities within the area shown.

This map contains data usable in identification of areas involving slope stability but it cannot be used as a substitute for detailed engineering investigations of specific sites.