
Fragments on the Surface

This section discusses the description of rock fragments (especially stones and boulders) that are *on the soil* as opposed to *in the soil*. The description of gravel, cobbles, and channers (≥ 2 but < 250 mm in diameter) differs from that for stones and boulders (≥ 250 mm in diameter) because an important aspect of gravel, cobbles, and channers is their areal percent cover on the ground surface. This cover provides some protection from wind and water erosion. It may also interfere with seed placement and emergence after germination. For stones and boulders, the percent of cover is not of itself as important as the interference with mechanical manipulation of the soil. For example, a very small areal percentage of large fragments, insignificant for erosion protection, may interfere with tillage, tree harvesting, and other operations involving machinery.

The areal percentage of the ground surface is determined using point-count and/or line-intersect procedures. If the areal percentage equals or exceeds 80 percent, the top of the soil is considered to be the mean height of the top of the rock or pararock fragments. The volume proportions of the 2 to 5 mm, 5 to 75 mm, and 75 to 250 mm fragments should be recorded. This can be done from areal measurements in representative areas.

The number, size, and spacing of stones and boulders (≥ 250 mm in diameter) on the surface of a soil, including both those that lie on the surface and those that are partly within the soil, have important effects on soil use and management. The classes are given in terms of the approximate amount of rock fragments of stone and boulder size at the surface:

Class 1.—Stones or boulders cover 0.01 to less than 0.1 percent of the surface. The smallest stones are at least 8 meters apart; the smallest boulders are at least 20 meters apart (fig. 3-9).

Class 2.—Stones or boulders cover 0.1 to less than 3 percent of the surface. The smallest stones are not less than 1 meter apart; the smallest boulders are not less than 3 meters apart (fig. 3-10).

Class 3.—Stones or boulders cover 3 to less than 15 percent of the surface. The smallest stones are as little as 0.5 meter apart; the smallest boulders are as little as 1 meter apart (fig. 3-11).

Class 4.—Stones or boulders cover 15 to less than 50 percent of the surface. The smallest stones are as little as 0.3 meter apart; the smallest boulders are as little as 0.5 meter apart. In most places it is possible to step from stone to stone or jump from boulder to boulder without touching the soil (fig. 3-12).

Class 5.—Stones or boulders appear to be nearly continuous and cover 50 percent or more of the surface. The smallest stones are less than 0.03 meter apart; the smallest boulders are less than 0.05 meter apart. Classifiable soil is among the rock fragments, and plant growth is possible (fig. 3-13).

These limits are intended only as guides to amounts that may mark critical limitations for major kinds of land use. Table 3-4 is a summary of the classes.

Table 3-4

Classes of Surface Stones and Boulders in Terms of Cover and Spacing

| Class | Percentage of surface covered | Distance in meters between stones or boulders if the diameter is: | | | Descriptive term |
|-------|-------------------------------|---|-------|-------|---------------------------------------|
| | | 0.25 m* | 0.6 m | 1.2 m | |
| 1 | 0.01 to < 0.1 | ≥ 8 | ≥ 20 | ≥ 37 | Stony or bouldery |
| 2 | 0.1 to < 3.0 | 1-8 | 3-20 | 6-37 | Very stony or very bouldery |
| 3 | 3.0 to < 15 | 0.5-1 | 1-3 | 2-6 | Extremely stony or extremely bouldery |
| 4 | 15 to < 50 | 0.3-0.5 | 0.5-1 | 1-2 | Rubbly |
| 5 | ≥ 50 | < 0.3 | < 0.5 | < 1 | Very rubbly |

* 0.38 m if the fragment is flat.

Classes of Surface Stones and Boulders in Terms of Cover and Spacing

| Class | Percentage of surface covered | Distance in meters between stones or boulders if the diameter is: | | | Descriptive term |
|-------|-------------------------------|---|-------|-------|---------------------------------------|
| | | 0.25 m* | 0.6 m | 1.2 m | |
| 1 | 0.01 to < 0.1 | ≥ 8 | ≥ 20 | ≥ 37 | Stony or bouldery |
| 2 | 0.1 to < 3.0 | 1-8 | 3-20 | 6-37 | Very stony or very bouldery |
| 3 | 3.0 to < 15 | 0.5-1 | 1-3 | 2-6 | Extremely stony or extremely bouldery |
| 4 | 15 to < 50 | 0.3-0.5 | 0.5-1 | 1-2 | Rubblly |
| 5 | ≥ 50 | < 0.3 | < 0.5 | < 1 | Very rubblly |

* 0.38 m if the fragment is flat.