

Master Horizons and Layers

The capital letters O, A, E, B, C, R, and W represent the master horizons and layers of soils. These letters are the base symbols to which other characters are added to complete the designations. Most horizons and layers are given a single capital-letter symbol; some require two.

O Horizons

Layers dominated to organic material. Some are saturated with water for long periods or were once saturated but are now artificially drained; others have never been saturated.

Some O layers consist of undecomposed or partially decomposed litter (such as leaves and lichens) that has been deposited on the surface. They may be on top of either mineral or organic soils. Other O layers consist of organic material that was deposited under saturated conditions and has decomposed to varying stages. The mineral fraction of such material constitutes only a small percentage of the volume of the material and generally much less than half of its weight.

Some soils consist entirely of materials designated as O horizons or layers.

An O layer may be on the surface of a mineral soil, or it may be at any depth below the surface if it is buried.

A horizon formed by the illuviation of organic material into a mineral subsoil is not an O horizon, although some horizons that have formed in this manner contain considerable amounts of organic matter.

A Horizons

Mineral horizons that have formed at the surface or below a O horizon. They exhibit obliteration of all or much of the original rock structure and show one or both of the following:

- (1) An accumulation of humified organic matter closely mixed with the mineral

fraction and not dominated by properties characteristic of E or B horizons (defined below) or

(2) Properties resulting from cultivation, pasturing, or similar kinds of disturbance.

In some areas, such as areas of warm, arid climates, the undisturbed surface horizon is less dark than the adjacent underlying horizon and contains only small amounts of organic matter. It has morphology distinct from the C layer, although the mineral fraction is unaltered or only slightly altered by weathering.

Such a horizon is designated as an A horizon because it is at the surface. Recent alluvial or eolian deposits that retain fine stratification are not considered to be A horizons unless cultivated.

E Horizons

Mineral horizons in which the main feature is the loss of Silicate clay, iron, aluminum, or some combination of these, leaving a concentration of sand and silt particles or other resistant minerals.

These horizons exhibit obliteration of all or much of the original rock structure.

An E horizon is most commonly differentiated from an underlying B horizon in the same sequum by a color of higher value or lower chroma, or both, by coarser texture, or by a combination of these properties. In some soils the color of the E horizon is that of the sand and silt particles, but in many soils coatings of iron oxides or other compounds mask the color of the primary particles. An E horizon is most commonly differentiated from an overlying A horizon by its lighter color.

It generally contains less organic matter than the A horizon.

An E horizon is commonly near the surface, below an O or A horizon and above a B horizon, but eluvial horizons that are within or between parts of the B horizon or extend to depths greater than those of normal observation can be assigned the letter E if they are pedogenic.

B Horizons

Horizons that have formed below an A, E, or O horizon. They are dominated by the obliteration of all or much of the original rock structure and show one or more of the following:

1. Illuvial concentration of silicate clay, iron, aluminum, humus, carbonates, gypsum, or silica, alone or in combination.
2. Evidence of the removal or addition of carbonates.
3. Residual concentration of oxides.
4. Coatings of sesquioxides that make the horizon conspicuously lower in color value, higher in chroma, or redder in hue, without apparent illuviation of iron.
5. Alteration that forms silicate clay or oxides, or both, and that forms a granular, blocky, or prismatic structure if volume changes accompany changes in moisture content.
6. Brittleness or Strong gleying.

All of the different kinds of B horizons are, or were originally, subsurface horizons. Included as B horizons, where contiguous to other genetic horizons, are layers of illuvial concentration of carbonates, gypsum, or silica that are the result of pedogenic processes (and may or may not be cemented) and brittle layer that show other evidence of alteration, such as prismatic structure or illuvial accumulation of clay.

C Horizons

Horizons or layers, excluding strongly cemented and harder bedrock, that are little affected by pedogenic processes and lack the properties of O, A, E, or B horizons. Most are mineral layers. The material of C layers may be either like or unlike the material from which the solum has presumably formed. The C horizon may have been modified, even if there is no evidence of pedogenesis; Included as C layers are sediment, saprolite, bedrock, and other geologic materials that are moderately cemented or less cemented. The excavation difficulty in these materials commonly is low or moderate.

Some soils form in material that is already highly weathered, and if such material does not meet the requirements for A, E, or B horizons, it is designated by the letter C. Changes that are not considered pedogenic are those not related to the overlying horizons. Some layers that have accumulations of silica, carbonates, gypsum, or more soluble salts are included in C horizons, even if cemented. If a cemented layer formed through pedogenic processes, however, it is considered a B horizon.

R Layers

Strongly cemented to indurated bedrock.

Granite, basalt, quartzite, limestone, and sandstone are examples of bedrock designated by the letter R. The excavation difficulty commonly exceeds high. The R layer is sufficiently coherent when moist to make hand-digging with a spade impractical, although the layer may be chipped or scraped.

Some R layers can be ripped with heavy power equipment. The bedrock may have cracks, but these are generally too few and too small to allow root penetration. The cracks may be coated or filled with clay or other material.

W layers:

This symbol indicates water layers within or beneath the soil. The water layer is designated as *Wf* if it is permanently frozen and as *W* if it is not permanently frozen. The *Wf* designation is not used for shallow water, ice, or snow above the soil surface.

Subordinate distinctions within master horizons and layers:

Lower case letters are used as suffixes to designate and describe the specific kind of master horizons and layers, e.g. a B horizon which is permanently frozen is designated *Bf*.

The lower case letter f indicates frozen horizon. The symbols and their meanings are as follows:

- a plowed A horizon may be designated an "**Ap**" horizon, with "**p**" indicating that the soil has been plowed and is therefore not in a natural condition.
- Uncultivated A horizon designated as "**Ah**"
- unrecompensed plants litter (dead leaves, etc.) designated as "**Oi**".
- partly decomposed organic layer as "**Oe**".
- black humified (well decomposed) well drained organic layer as "**Oa**".
- fibrous as "**Of**"; semi-fibrous as "**Om**"; humified "**Oh**".
- B horizon (illuvial) subsoil horizon underlying A or B that is: altered by soil forming processes including illuvial accumulation of clay and iron oxides, soil structure forming, and carbonate removal to give a distinct color or structure; "**Bw**" enriched with illuvial clay, "**Bt**" Argillic; or enriched with iron and aluminum to give reddish hue and high chroma "**Bs**" or sesquioxides.
- gleyed C Horizon as "**Cg**".