

# PRINCE WILLIAM AT BAY

## AGRONOMIC CONSIDERATIONS BEFORE AMENDING SOILS WITH FILL DIRT

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Generally, the upper part of the soil, which is richest in organic matter, is most desirable for use as topsoil; however, material excavated from deeper layers is also used. There are several soil properties that are used to rate the soil as topsoil. Although all are important this article will address properties that affect plant growth and spreading of the soil material.

The physical and chemical soil properties and qualities that influence plant growth are the presence of toxic substances, soil reaction, and those properties that are inferred from the soil texture, such as the available water capacity and fertility. Excessive amounts of substances that restrict plant growth, such as sodium, salt, sulfur, copper, and nickel, create problems in establishing vegetation and, therefore, also influence erosion and the stability of the surface.

Materials that are extremely acid or have the potential upon oxidation of becoming extremely acid are difficult and expensive to vegetate. Vegetation is also difficult to establish on

soils that have high pH. They also contribute to poor water quality, in runoff or in ground water.

The available water capacity also is important in establishing vegetation. Available water capacity is the volume of water that should be available to plants if the soil, inclusive of fragments, were at field capacity.

Soils that have a low available water capacity may require irrigation for the establishment of vegetation. Depending on their abundance and porosity, rock fragments reduce available water capacity. Nonporous fragments reduce available water capacity in proportion to the volume they occupy, for example, 50 percent nonporous cobbles reduces available water capacity as much as 50 percent. Porous fragments, such as sandstone, may reduce available water capacity to a lesser proportion.

The stability of the soil depends upon its erodibility by water and its strength. Water erodibility is indicated by the K factor. Potential slippage hazard is related to soil texture, and although other factors also contribute, the ratings of soil texture represent one important factor.

Soil texture also influences a number of the properties listed above, such as available water capacity and erodibility by water. Texture also influences soil structure and consistence, water intake rate, runoff, fertility, workability, and trafficability. Loamy materials as opposed to clayey have a very positive effect on the properties mentioned above.

The properties that influence the ease of spreading are the amount of rock fragments, slope, and soil texture. Rock fragments > 3 inches in diameter in excess of 30 percent of the soil by weight have very poor spreading characteristics. Slopes in excess of 15 percent could create stability and erosion concerns. Soil textures with a clay fraction between 18 and 35 percent are easily spread. Soils above 35 percent are considered to clayey.

If you are planning to accept vast quantities of fill dirt on your farm you need to ask yourself .... Will the material used to cover the area improve soil conditions for the establishment and maintenance of adaptive vegetation?

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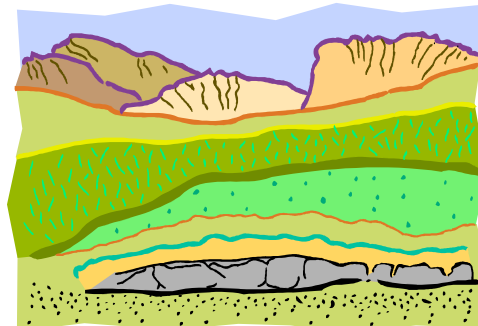


The Commonwealth of Virginia  
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## Does Your Soil Have a Profile?

By Linda Johnston

Yes! All soils have a profile. If you look at a cut in the earth along the road, you will notice layers in the soil. These are called soil horizons and they make up a soil profile. Soil layers are visible because they differ in color, texture, structure, and thickness. They also differ in chemical properties, mineral content, and in other less visible ways. Many factors influence the profile including climate, topography, plant or animal life in the area, and parent material. Parent material is the type of rock found in the area. A soil profile has many horizons. On the very top of the soil (at the top of the profile) is the organic matter. This is leaf litter, twigs, and other vegetation. As we go deeper in this layer, the vegetation is decaying or decomposing. This decaying organic matter is also known as humus.



The next layer, as we go down in the profile, is the topsoil. This layer is where broken up rock, formed from weathering processes, starts to mix with decaying organic material. This decomposing organic matter gives this layer a dark color. Plant roots are found in this layer. Earthworms are also found in this layer. A square yard of cropland in the United States can contain from 50 to 300 earthworms. Continuing downward, we find the subsoil layer. The roots of large plants may make their way to this layer. Many burrowing animals will make their homes in the subsoil.

The next layer down is known as the parent material layer. In this layer the bedrock has begun to break up into large pieces. This is where the inorganic, or nonliving, part of the soil comes from.

The lowest layer in the soil profile is not actually soil at all. It is hard bedrock. Soil horizons help us understand and identify types of soil. Soil horizons and profiles for Prince William County are available in the Prince William County Soil Survey. Please call our office for details.

For more information on soil profiles, you may want to visit the NRCS Web site at <http://soils.usda.gov/education/resources>.

## Use of Fill Dirt on Agricultural Operations

By Kate Norris

Use of fill dirt that will disturb more than 2,500 square feet is regulated by Virginia Code and is enforced locally by Prince William County. The Department of Public Works is responsible for issuing permits and handling violations.

Some agriculturally-based land disturbing activities are exempt from the permit process. If you plan to accept fill dirt on your farm you should first contact the Soil and Water Conservation District to learn more about the regulatory process as it relates to farms and specifically your operation. If your farm-use meets the eligibility requirements to be exempt from the permit process, the SWCD will conduct site evaluations and provide guidance for use of fill dirt on your operation through the development of a Soil and Water Quality Conservation Plan.

Please note that use of fill dirt in wetlands, floodplains, and Resource Protection Areas anywhere within Prince William County is not allowed. It is the responsibility of the landowner-- not the fill dirt supplier-- to make sure all State and County regulations are followed.

## Factors Influencing Erosion

By Beata Coss

The 4 major factors which influence soil erosion are climate, soils topography and vegetation.



### Climate:

Climate factors such as rainfall, temperature and snow are the major erosion agents in the erosion process. Rainfall is the major cause of erosion on disturbed and denuded areas. The power of the raindrops is capable of detaching and moving soil particles. They are also able to compact, puddle and seal the soil surface. Another aspect of rainfall is its distribution. The most erosive rains fall in Virginia in the month of June through September. Rains create runoff water. Runoff begins when the soil rainfall exceeds intake capacity. It forms flow as a sheet flow or more intense as channel flow.

*Grand Canyon is a result of erosions*

### Soils:

This is the second major factor influencing soil erosion. All soils erode in different ways. The difference in erosion rates influenced by soil properties is what we call soil erodeability factor or "K" factor. These properties are:

- Infiltration: properties that affect the rate at which water enters into the soil.
- Permeability: properties that affect the rate at which water moves through the soil
- The total water capacity of the soil
- Factors that effects detachment by raindrop impact & detachment by rolling, lifting of flowing water
- Characteristics of the soil that transporting forces of rainfall and runoff.

The larger the value of the K factor, the more erodable the soil. K factors generate 3 groups. If the K factor value is 0.23 and lower the soil has low erodeability. If the value between 0.24 and 0.36 the soil is moderately erodable. 0.37 and higher value indicates highly erodable soils.

### Topography:

In this category the slope length and the slope steepness are the discussed factors. The slope shape and slope direction also have some effect.

Slope length is a distance from the point where the overland flow begins to the point where it enters a well defined waterway or low point. The longer the slope is the greater the depth of runoff. The steepness of the slope influences erosion also. Slope gradients can be grouped into 3 category 0-7% slope has low erosion hazard, 7-15% slopes have moderate erosion hazards and if the slope steepness 15% and higher that slope indicates a high erosion hazard

The shape of the slope also has effect on erosion. Convex slopes and concave slopes erosion will be either more (on convex) or less erosion damage.

### Surface Cover

The last factor ground cover is the most important factor to control soil erosion. Vegetation or other surface covers have the greatest control. Dramatic soil loss reduction can be achieved when the soil is covered with vegetation. An experiment, where 2 plots, a covered and a bare area were compared in amount of soil loss, proved that the soil loss on the bare plot was 100 times more than on the vegetated plot in a 10 year period. Grasses are the most effective ground cover; they are able to reduce soil loss over 90-99%. There are seasonal grasses available to grow during the seasons of spring, summer and fall. The best ground covers in winter are mulch and wood cellular fibers.

(Source: Training Notebook Basic E&S Control in VA, DCR)

## Quiz Time

**Characteristics of common PWC soils – Is there really a “black jack” soil?/where does that slang term come from**

**True or False: Prince William County contains “Black Jack” soil?**

*False. “Black Jack” soil is slang term and not an official soil unit. Locally “Black Jack” is commonly used to refer to soil types that have a high clay content making them hold water in wet conditions and to dry and crack during periods without rain.*

*Copies of the soil survey of Prince William County are available from our office. The soil survey includes maps locating all the soil types in the County as well as information on soil management, properties and classifications*



**PRINCE WILLIAM**

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*Our Mission...*

*The mission of the Prince William Soil & Water Conservation District is to provide leadership in the conservation of soil, water, and related resources to all Prince William County citizens, through technical assistance, information, and education.*

*The public is welcome at District meetings, which are held monthly on the 2nd Thursday of the month at 12:30 p.m. in the Prince William Soil and Water Conservation District Conference Room. Please call (703) 594-3621 to confirm that a meeting has not been cancelled or postponed.*

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