

Appendix II

Evaluating and Interpreting the Landscape and Soil Pedon

Competency: Evaluate the soil landscape

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The first thing soil scientists do in describing a soil profile is to locate the boundaries of major horizons. Then they list the color, mottles, texture, structure, volume of rock fragments, special features and the horizon name. Except for soil texture, these are soil properties that are most obvious and can be seen. The texture, in most cases, is the most difficult soil property to determine, but can be estimated with a keen sense of feel.

To describe a soil profile:

1. Locate boundaries of major horizons. (See Chapter 6.)
2. For each horizon, determine:
 - soil color (See Chapter 3.)
 - mottles (See Chapter 3.)
 - texture (See Chapter 4.)
 - structure (See Chapter 5.)
 - percentage of rock fragments (See Chapter 11.)
 - special features (See Chapters 4 and 6.)
 - name the horizon (See Chapter 6.)

1. Locating Boundaries of Major Horizons

For most soil judging contests, the horizon boundaries will be located by the judges. This is because it is very difficult to be exact on field estimates. In differences of 1 to 3 inches, one may be as correct as another, but this would make scoring very difficult. However, students can learn how to locate horizon boundaries by following the steps listed below.

1. Look for color changes. Where there is an obvious color change, there is also a horizon change, but it may not be a master horizon change. For example, the change may be to subordinate division of a master horizon. Color alone, however, is not sufficient to separate all horizons. Several soils in Missouri have nearly uniform colors extending all the way through the B and into the C horizon.
2. Take a knife or probing tool and gently poke the soil every few inches from the surface down to the lower part of the pit. Often you can “feel” that the soil gets firmer in the subsoil and restrictive layers. You may even be able to locate a contact between B and C horizons this way.
3. Starting at the top, you should check the soil texture with your fingers every 2 to 4 inches. If there is a marked increase in clay from the A to the B horizon, or a decrease in clay from the B to the C horizon, it can be detected this way.
4. With a knife or probing tool, remove a handful of soil from the upper 4 inches of soil. Carefully break it apart and observe the size, shape, and strength of the structural aggregates. Repeat this process every 4 to 6 inches down through the profile. Structural changes may be good clues to the boundaries between horizons and the presence of transition horizons.

5. Each time a tentative boundary is located, mark the depths on a scorecard or with nails on the soil profile. As more characteristics are considered, boundaries can be adjusted up or down.
6. When the initial set of boundaries has been determined, start looking more carefully at the color, texture, structure, pores, clay films, etc., of each horizon. With a complete set of information, a final adjustment in location of each horizon boundary can be made.

2. Determining Soil Properties for Each Horizon

Color - Determine the matrix color of each horizon using the four basic color groups listed. Access to a Munsell soil color book would be useful for each team to have for practice.

Mottles - Determine the abundance of all mottles; gray, brown, red, etc.

Texture - Carefully determine the texture of each horizon. This is very important because several other interpretations will be based on the texture.

Structure - Structure may be difficult to see. If in doubt, remember most cultivated A horizons are granular unless high in clay and organic matter. Most E horizons are platy, most B horizons are blocky or prismatic. C horizons are massive or single grain if sandy.

Percentage of rock fragments - Give percentage of rock fragments, 2 mm to 10 in, the give only those 3-10 in.

Special features - Fragipan or abrupt textural change.

Name the Horizon - Use the classifications of AP, A, E, B, C, Cr, and R.

PROPERTIES OF THE WHOLE SOIL

1. **Effective rooting depth.** Cr or R horizons and fragipans are the major features.
2. **Available Water Capacity.** Use the chart for finding AWC for each texture. Do not add for fragipans or horizons below a fragipan.
3. **Permeability.** Determined by texture on the permeability chart.
4. **Internal drainage.** Determined by depth to a water table (gray matrix or gray mottles) and texture for excessively and somewhat excessively drained soils.
 - a. Excessively and somewhat excessively drained soils generally are sands or sandy loams and often extremely gravelly or cobbly and the permeability is rapid or moderately rapid.

- b. Well drained to very poorly drained soil may have any texture. The drainage class is determined almost entirely by the depth to a water table. (See “Guide for internal drainage” and “Depth to water table”.)
5. **Shrink-swell potential.** Determined by texture and type of clay. (See “Guide for determining shrink-swell potential”.)

SITE CHARACTERISTICS

When judging the site characteristics, be very careful with slope, stoniness, and rockiness, as several management interpretations are affected by them. (See Chapter 10.)

MANAGEMENT INTERPRETATION

Match the answers given for the profile description on page 1 of the scorecard, properties of the whole soil and site characteristics with the guides for each management interpretation. If the correct answer splits a class boundary, give the next highest answer.