

**Soil Sampling for the Missouri Department of Natural Resources
Soil and Water Conservation Program (SWCP)
Cover Crops Cost-Share Program**

Soil Health Assessments

The following is a listing of the individual soil assessments that will be employed for soil health analysis for the MoDNR Soil and Water Program's cover crops cost share program:

Initial Standard Soil Health Package \$90

- Simplified Particle Size
- Active Carbon
- Total Organic Carbon (also converted to Organic Matter)
- Mineralizable Nitrogen
- Wet Aggregate Stability
- pH (salt and water)
- Effective Cation Exchange Capacity plus exchangeable bases
- Effective Base Saturation
- Exchangeable Al
- Plant Available Phosphorus
- Bulk Density

Follow-Up Standard Soil Health Package \$70

- Active Carbon
- Total Organic Carbon (also converted to Organic Matter)
- Mineralizable Nitrogen
- Wet Aggregate Stability
- pH (salt and water)
- Effective Cation Exchange Capacity
- Effective Base Saturation
- Exchangeable Al
- Plant Available Phosphorus
- Bulk Density

The initial standard package will be initiated before seeding cover crops in year 1. If the landowner will be receiving cost-share on the same field where the initial standard test was sampled at least 3 years after the initial test, and the field contained cover crops in all the previous years, then samples for the follow-up standard package test will need to be taken from the field. The follow-up sampling site must be taken in the same location of the field as the original sampling site.

Soil Sampling Location

The number of soil sampling sites per management unit/field will be based on the complexity of the soil mapping units on the unit/field as well as landscape position. Figure 1 provides a hillslope cross-section to depict the location of the soil within the soil landscape. If the majority (60% plus) of the crop cover management area is within one hillslope element select that component for your sampling site to represent the field. If the field is comprised of primarily two major hillslope elements, for example a summit and a backslope hillslope element, two (2) sampling sites, the summit and the backslope should be sampled. Each sampling site will be comprised of 4 separate ring samples taken in close proximity. These 4 separate ring samples will be composited together to make the sample for that hillslope element/sampling site.

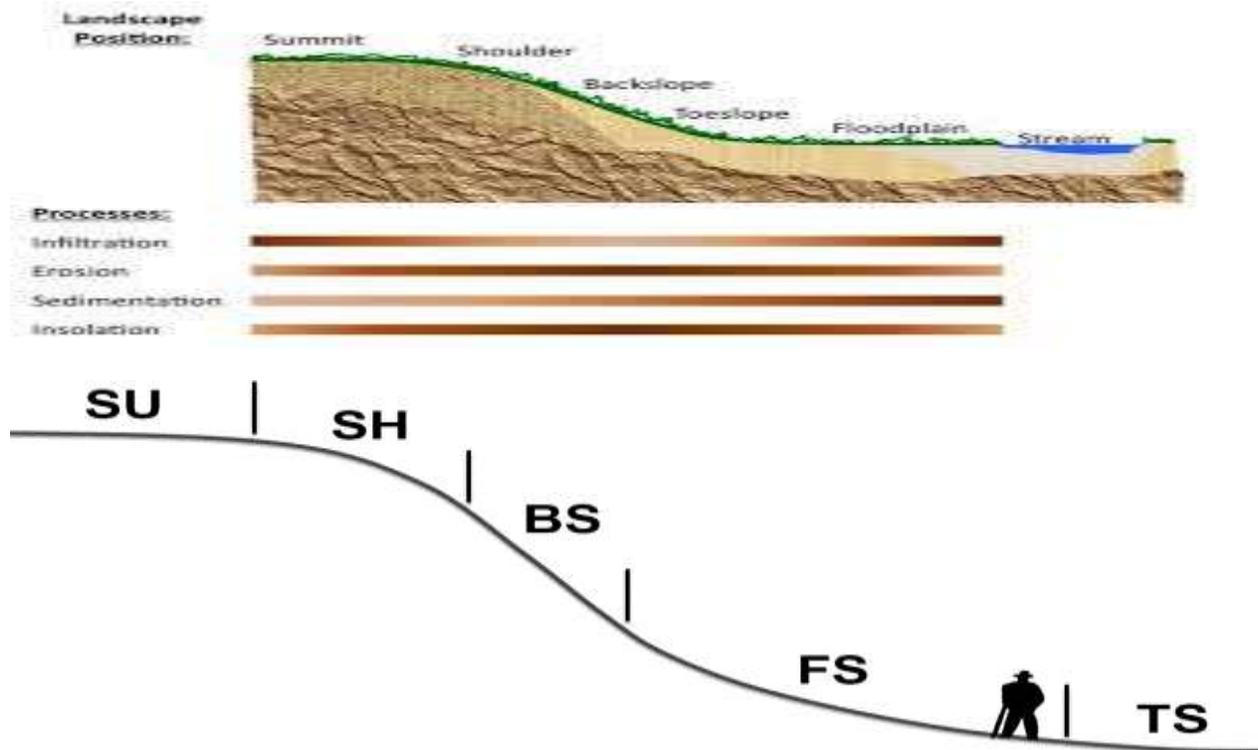


Figure 1. A hillslope cross-section to depict the location of sampling in the soil landscape. (Su = Summit; Sh = Shoulder slope; Bs = Backslope; Fs = Footslope; Ts = Toeslope/Floodplain).

Sampling equipment needed include: bulk density metal sampling ring, wood board, hammer/mallet, shovel or trowel, a spatula or small knife, and one gallon ziplock bag per sample. The metal bulk density sampling ring provides for measurement of bulk density, allows for measuring moisture content at time of sampling, and helps provide a uniform sampling depth of undisturbed soil.

After you have selected the hillslope position(s) and the sampling site(s) within the field or management area, the surface area for each site needs to be devoid of plant residue. If the field was last in a row crop, sample the middle between the rows (for example 15 inches between the

30 inches of row spacing). This area should be a middle that shows no tire tracks. If the last crop was drilled, an area that does not have evidence of a recent tire track should be used. Rake back the residue to provide bare soil surface for taking 4 separate ring samples which will all be composited in the ziplock bag to represent the soil sample for that sampling site and associated hillslope element. An area of about 4 feet long should be cleared of residue so that each ring sample is approximately 12 inches apart in the row middle.

To initiate the sampling process, place the bulk density sampling ring on the soil surface, sharp edge on the soil. With the placement of the wood board and mallet (figure 2), gently push the ring into the soil until the top of the ring is flush with the soil surface. You may need to have access of a small shovel or trowel to dig under the ring to remove it with the soil intact. Once the soil and ring are extracted, trim off the soil on each end of the ring (figure 3). The spatula or small knife should be used to remove each sample from the ring into the ziplock gallon bag so that 4 ring samples are in the bag to represent the sampling site. In some cases, removal of the soil sample from the ring into the sampling bag can be difficult. You may have to push or cut the sample out of the ring onto a clean pan so soil is not lost. **Under no circumstances should soil be dug and added to the bulk density ring.** It is critical that all four full ring samples of previously **undisturbed** soil are placed in the ziplock bag to represent the sampling site. The idea is to find the weight of a known volume of soil as it is in the field to evaluate its level of compaction.

Your sample is complete for appropriate labeling and submission to SHAC once you have 4 composite ring samples in the ziplock bag to represent the specific sampling site and hillslope element. The labeling on the sample bag should contain: Date, Name, Address, Email address or Phone Number, Tract and Farm number and County where the sample was taken.

A Sample Information form is available on the SHAC website that needs to be filed out for each sample and submitted with the sample(s). The form will capture more specific information about the sampling site which is needed to support the analysis.



Figure 2. Seating the bulk density sampling ring into the soil to get a representative soil sample. The wood board and mallet are used to get a full bulk density sample.



Figure 3. A full, trimmed bulk density sample which is ready to be placed in the gallon ziplock sampling bag as one of the four composite bulk density samples.

A check payable to the University of Missouri needs to be included in the package with the sample(s).

The sample may be dropped off at the Lab or shipped to:

Missouri Soil Health Assessment Center
College of Agriculture, Food and Natural Resources
3600 New Haven Road
University of Missouri
Columbia, MO 65201
573-882-3704

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