



## Soil Health Partnership – Soil Sampling Protocol.

The Scientific Advisory Council recommended the following schedule of soil sampling:

Baseline soil sampling will be conducted **pre-plant/pre-fertilizer** in the spring (within a month of planting) of the starting year for each selected farm. The samples will be used to characterize several soil attributes. Subsequent soil sampling will be conducted in the spring **pre-plant/pre-fertilizer** (within a month of planting) of the 3<sup>rd</sup> and 5<sup>th</sup> year as a means of comparison.

Objectives:

The initial objectives are to:

- 1) Collect grower information
- 2) Locate grower fields
- 3) Establish experiment and plot boundaries and
- 4) Establish baseline soil characterization for long-term soil health systems

A grower information collection protocol will be provided to collect basic cooperator information, but each grower must supply

- 1) Grower name
- 2) Grower address (Township, county, state)
- 3) Cover crop field boundary GPS coordinates (four corners)
- 4) Cover crop testing strip boundary GPS coordinates (reference points for testing strips)

Three soil analysis labs will be utilized to analyze key variables. Protocols for each sample type are provided below.

The three soil analysis labs are the following:

- 1) Solum for standard nutrient analysis:  
P, K, pH, BpH, OM, S, Zn, Ca, Mg, Na, %BSAT, CEC.
- 2) Cornell University for conducting a Soil Health Assessment:  
Texture, aggregate stability, AWC, active carbon, soil respiration, soil protein and soil pathogens
- 3) Soil Health Nutrient Tool:  
Bio-available N, bio-available P and soil respiration
- 4) Phospholipid fatty-acid (PLFA) analysis

It was determined that soil sampling will be conducted locally following an established protocol. The costs of sampling will be covered by the Soil Health Partnership. A sampling map, sampling bags, identification bar codes and detailed protocol instructions will be provided below. A discussion between the Soil Health and Sustainability Manager, soil sampler and the grower will be required to understand where the treatment and control strips will be located before conducting soil sampling.

After sampling, the samples of the commercial lab will be stored (need to find a storage place). All soil test results will be shared back with cooperators.

Submission Addresses:

Routine soil analysis samples will be sent to Solum:

Solum, Inc.  
615 South Bell Avenue  
Ames, IA 50010

Cornell soil health samples will be sent to:

Cornell Nutrient Analysis Lab (CNAL),  
G01 Bradfield Hall  
Ithaca, NY 14853

Haney soil health samples will be sent to:

Richard L. Haney  
Soil Scientist  
Grassland Soil and Water Research Laboratory  
USDA-ARS  
808 East Blackland Rd.  
Temple, TX 76502

PLFA samples will be sent to:

Dr. Chuck Rice  
Kansas State University  
2004 Throckmorton Plant Sciences Center  
Department of Agronomy  
Manhattan, KS 66506-5501

## Labeling

- **Routine analysis – Label samples based upon *Date-NA-Lastname-Strip# -Subsample number***
  - Ex. 5-4-14 – NA – Goeser– 1 – 1 -02 (0-2 inch sample)
  - Ex. 5-4-14 – NA – Goeser– 1 – 1 -26 (2-6 inch sample)
- **Cornell Soil Health Assessment – Label samples based upon *Date-SHC-Lastname-Strip# -Subsample number***
  - Ex. 5-4-14 – SHC - Goeser – 1 - 1
- **ARS Soil Health Test – Label samples based upon *Date-SHT-Lastname-Strip# -Subsample number***
  - Ex. 5-4-14 – SHT - Goeser – 1 - 1

## Routine nutrient analysis soil sampling guidelines

- A grid sampling map will be provided to each cooperator to facilitate soil sampling (Figure 1 example)
  - Each grid map will have individually assigned grid sampling points within each treatment or control strip
  - Each pre-assigned sampling point will follow naming convention provided by the Soil Health Partnership and be linked to the bar code mentioned below
- Grid based soil sampling will be conducted based upon individually assigned grid sampling map, with 1 acre grid.
  - Acre grids will be based upon total field area.
- All soil samples will be hand collected
  - Bags will be provided by the Soil Health Partnership
  - Each sample will be a composite of 12 soil cores, collected in a 30' circle around the point
  - Sampling depth: Two samples will be collected 0 - 2 inches and 2 - 6 inches for all experiments.
  - Collect GPS point in the center of 12 core sampling circle
- **Labeling – Label samples based upon *Date-NA-Lastname-Strip# -Subsample number***
  - Ex. 5-4-14 – NA – Goeser – 1 - 1
- Each sample will have a unique bar code to correspond with predefined sample name provided by the Soil Health Partnership
- Soil samples will be shipped (ground) to Solum for the standard tests within 24 hours of sampling [alternatively: same day].



*Figure 1: Example grid sampling map individually assigned to each grower. Each sampling location will be submitted as individual samples to Solum.*

## Soil Sampling Procedure for Cornell Soil Health Assessment

- A map will be provided to each cooperator to facilitate soil health assessment sampling (Figure 2 example)
  - Each grid map will have individually assigned composite soil health assessment samples collected based upon field attributes (please see path below in Figure 2)
  - Each composite soil health assessment sample across each testing strip
  - Each pre-assigned sampling point will follow naming convention provided by the Soil Health Partnership and be linked to the bar code mentioned below
- Individual samples should be taken and bulked into composite samples across each testing strip (8 samples in total)
- Take enough samples to fill a half gallon zip lock bag per strip, no cloth bags. - Each sample will be a composite of 12 soil cores, collected in a 30' circle around the point
- All soil health assessment samples for Cornell Soil Health assessment will be 0-6 inch depth samples.
- **Labeling – Label samples based upon *Date-SHC-Lastname-Strip# -Subsample number***
  - **Ex. 5-4-14 – SHC – Goeser – 1 – 1**
- Keep samples cool in a cooler while in field and in transport to shipping
- Pack samples with blue ice for shipping
- Soil samples will be sent immediately (overnight) to Cornell for testing – do not sample or ship on Friday and ensure same day pickup.

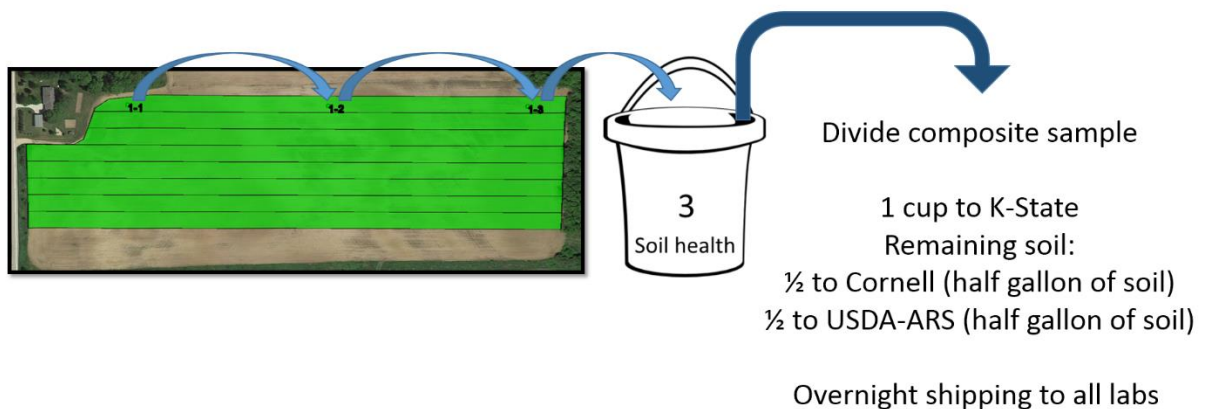


Figure 2: Sampling design for soil health assessment samples.

## Soil Sampling Procedure for ARS Soil Health Nutrient Tool

- A map will be provided to each cooperator to facilitate soil health assessment sampling (Figure 2 example)
  - Each grid map will have individually assigned composite soil health assessment samples collected based upon field attributes
  - Each pre-assigned sampling point will follow naming convention provided by the Soil Health Partnership and be linked to the bar code mentioned below
- Individual samples should be taken and bulked into composite samples across each testing strip (8 samples in total)
- Take enough samples to fill a half gallon zip lock bag per strip, no cloth bags. - Each sample will be a composite of 12 soil cores, collected in a 30' circle around the point
- All soil health assessment samples for ARS soil health assessment will be 0-6 inch depth samples.
- **Labeling – Label samples based upon *Date-SHT-Lastname-Strip# -Subsample number***
  - **Ex. 5-4-14 – SHT – Goeser – 1 - 1**
- Keep samples cool in a cooler while in field and in transport to shipping
- Pack samples with blue ice for shipping
- Soil samples will be shipped immediately (overnight) to USDA- ARS for testing within 24 hours of sampling at the address provided - do not sample or ship on Friday ensure same day pickup.

## Soil Sampling Procedure for PLFA (Phospholipid fatty acid) analysis

- A map will be provided to each cooperator to facilitate soil health assessment sampling (Figure 2 example)
  - Each grid map will have individually assigned composite soil health assessment samples collected based upon field attributes
  - Each pre-assigned sampling point will follow naming convention provided by the Soil Health Partnership and be linked to the bar code mentioned below
- Individual samples should be taken and bulked into composite samples across each testing strip (8 samples in total across the entire field)
- Place 1 cup of soil per strip in a zip lock bag, no cloth bags. - Each sub-sample will be a composite of 12 soil cores, collected in a 30' circle around the point, composite sample will be collected from across the testing strip
- All soil health assessment samples for PLFA soil health assessment will be 0-6 inch depth samples.
- **Labeling – Label samples based upon *Date-PLFA-Lastname-Strip# -Subsample number***
  - **Ex. 5-4-14 – PLFA – Goeser – 1 - 1**
- Keep samples cool in a cooler while in field and in transport to shipping
- Pack samples with blue ice for shipping
- Soil samples will be shipped immediately (overnight) to Kansas State University for testing within 24 hours of sampling at the address provided - do not sample or ship on Friday ensure same day pickup.