

| Soil Test Package                                                        | Cost                           | Website                                                         | Contact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard PLUS Soil Health Analysis Package by Cornell University         | \$160 per sample (\$480 total) | <a href="#">Cornell Soil Health Lab</a>                         | <p>Bob Schindelbeck, Cornell Soil Health Laboratory Director<br/> <b>Specialties:</b> <a href="#">Quarantined soil shipment protocols</a> and data interpretation.<br/> Email: <a href="mailto:rrs3@cornell.edu">rrs3@cornell.edu</a> Phone: 607-227-6055</p> <p>Kirsten Kurtz, Cornell Soil Health Laboratory Assistant Director<br/> <b>Specialties:</b> Sample submission (initial lab contact, test results, turnaround time, etc.), lab analysis procedures<br/> Email: <a href="mailto:ksk64@cornell.edu">ksk64@cornell.edu</a><br/> Unsure?<br/> Email: <a href="mailto:soilhealth@cornell.edu">soilhealth@cornell.edu</a></p>                                                                                                                     |
| NRCS-216 Soil Health Analysis Package by Cornell University              | \$180 per sample (\$540 Total) | Same as above                                                   | Same as above                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Soil Health/Quality Package by University of Maine                       | \$90 per sample (\$270 Total)  | <a href="#">UMaine Soil Testing Lab</a>                         | <p><b>Bruce Hoskins</b><br/> Assistant Scientist<br/> 207.581.2945<br/> <b>Suzanne Perron</b><br/> Assistant Chemist<br/> 207.581.2917<br/> <b>Analytical Lab. &amp; Maine Soil Testing Service</b><br/> 5722 Deering Hall Orono, Maine 04469-5722<br/> <a href="mailto:anlab@maine.edu">anlab@maine.edu</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Soil Health Analysis Package II (NRCS CEMA 216) by University of Vermont | \$150 per sample (\$450 Total) | <a href="#">Soil Health Research &amp; Education Center UVM</a> | <p>For general questions regarding SHREC services and activities, please reach out to <a href="mailto:SHREC@uvm.edu">SHREC@uvm.edu</a>. Specific contacts are listed below:</p> <p>Joshua Faulkner (<a href="mailto:Joshua.Faulkner@uvm.edu">Joshua.Faulkner@uvm.edu</a>) - SHREC Director<br/> Deb Neher (<a href="mailto:Deborah.Neher@uvm.edu">Deborah.Neher@uvm.edu</a>) - SHREC Associate Director<br/> Marie English (<a href="mailto:Marie.English@uvm.edu">Marie.English@uvm.edu</a>) – SHREC Lab Manager<br/> Heather Darby (<a href="mailto:Heather.Darby@uvm.edu">Heather.Darby@uvm.edu</a>) – SHREC Extension Coordinator<br/> Shawn Lucas (<a href="mailto:Shawn.Lucas@uvm.edu">Shawn.Lucas@uvm.edu</a>) – Extension Assistant Professor</p> |

Table 1. Each soil process should be measured to evaluate overall soil health. Choose a method to measure the soil indicator from each column.

| <b>Soil Process and Indicator</b> | <b>Soil Aggregation – Wet Aggregate Stability</b>                                                                                              | <b>Carbon Cycling – Soil Organic C (SOC)</b>                                                        | <b>Microbial Activity – Soil Respiration</b>       | <b>Carbon Food Source for Microorganisms – Labile Carbon</b>         | <b>Food Source for Organisms – Bioavailable Nitrogen</b>                    |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------|
| <b>Reason for Measurement</b>     | Measure of the physical soil environment. Related to water infiltration, carbon and nutrient storage, biological activity, and reduced erosion | Related to soil structure, fertility, and provides microbes with food                               | Measure of how active the microbes are in the soil | Carbon food that is easily taken up by microbes                      | Related to protein that is readily available to microbes                    |
| <b>Preferred Method</b>           | Wet sieving (NRCS Soil Survey Staff, 2022)                                                                                                     | Dry combustion (NRCS Soil Survey Staff, 2022)                                                       | 24-hour incubation/burst (Zibilske, 1994)          | Permanganate Oxidizable Carbon (POXC) (NRCS Soil Survey Staff, 2022) | Autoclaved citrate extractable (ACE) protein content (Hurriso et al., 2018) |
| <b>Alternate Method</b>           | Cornell Sprinkle infiltrometer (Ogden et al., 1997)                                                                                            | SOC calculated from Soil Organic Matter measured by Loss on Ignition (NRCS Soil Survey Staff, 2022) | 96-hour incubation (Zibilske, 1994)                | Water extractable organic carbon (WEOC) (Haney et al., 2018)         | Water extractable organic nitrogen (WEON) (Haney et al., 2018)              |

Table 2. Soil characteristics are used to interpret soil health indicators. Choose a method to measure the soil characteristic from each column.

| Soil Characteristic     | Soil Texture                                                                       | Soil pH                                                |
|-------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Preferred Method</b> | KSSL Particle Size Distribution Analysis by pipette (NRCS Soil Survey Staff, 2022) | 1:1 water (NRCS Soil Survey Staff, 2022)               |
| <b>Alternate Method</b> | Hydrometer Method (Gee and Bauder, 1986)                                           | 0.01M CaCl <sub>2</sub> (NRCS Soil Survey Staff, 2022) |

Table 3. If additional soil biological information is desired, choose a method to measure microbial/functional diversity.

| Soil Indicator            | Microbial Diversity/Functional Diversity                                                                                                                                                                                                                                           |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Preferred Method</b>   | Phospholipid Fatty Acid (PLFA) (Buyer and Sasser, 2012)                                                                                                                                                                                                                            |
| <b>Alternative Method</b> | Choice of three of the following enzymes:<br>$\beta$ -Glucosidase (Carbon Cycling)<br>N-acetyl- $\beta$ -D-glucosaminidase (Carbon and Nitrogen Cycling)<br>Protease (Nitrogen Cycling)<br>Acid and/or Alkaline Phosphatase (Phosphorus Cycling)<br>Arylsulfatase (Sulfur Cycling) |