

Intro to SoilHealth

What is soil health?

Soil health, also referred to as soil quality, is defined as the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans. Soil is an ecosystem that can be managed to provide nutrients for plant growth, absorb and hold rainwater for use during dryer periods, filter and buffer potential pollutants from leaving fields, serve as a firm foundation for agricultural activities, and provide habitat for soil microbes to flourish and diversify to keep the ecosystem running smoothly. Soils have both inherent and dynamic properties. A soil's dynamic properties depend on how the soil is managed. Understanding soil health means assessing and managing soil so that it functions optimally now and is not degraded for future use. By monitoring changes in soil health, a land manager can determine if a set of practices is sustainable. (Information from [USDA-NRCS](#).)

Who is the SoilHealth Module for?

Farmers, gardeners, and other land managers.

What does the SoilHealth Module do?

The LandPKS Soil Health module allows users to **input and track data** about the dynamic properties of soil that are important for productivity and sustainability. Soil health indicators, when observed over time, can provide land managers critical information about how management practices are affecting their soil's health. Users can track data over time using the Field Calendar and then download PDF reports about their soil health in the Reports tab.

The SoilHealth module currently allows users to record **the following soil health indicators (field and laboratory)**.

Field indicators:

- **Erosion indicators**, including water flow patterns, rills and gullies. Erosion indicators reflect soil movement and loss from the site. They can also be used to detect excessive runoff, which can reduce water availability for plants. Water flow patterns are soil surface patterns caused by runoff. They are made visible by litter, soil, and gravel redistribution. Steep cuts may occur on one side.
- **Compaction layers**. A compaction layer is a near-surface layer of dense soil that is hard for crop roots and water to penetrate. Record depth to top of compaction layer, thickness of compaction layer, level of development, and extent.

- **Aggregate stability**, or the ability of soil aggregates to resist collapsing into smaller pieces due to tillage and wind or water erosion
- **Soil Smell**. Sweet, earthy soil smell indicates a biologically active soil. Soils that lack smell may have little biological activity. Soils with a stagnant, swampy or mineral smell may suggest a lack of oxygen and therefore poor soil structure.
- **Biological Activity**. Soil is filled with microscopic and larger organisms that perform many vital functions including converting dead and decaying organic matter, as well as minerals, to plant nutrients. They affect soil structure and therefore water availability and soil erosion. They can protect crops from pests and diseases. The SoilHealth module allows you to track if there are many, some, or no signs of organisms in the soil.

Laboratory indicators

- **Soil Organic Carbon/Matter**. Soil organic carbon (SOC) is a measurable component of soil organic matter (SOM). Reduction in soil organic matter levels lead to deficiency of nutrients for crops, decrease in soil aggregate stability and water holding capacity, and decline in soil biological activity.
- **pH**. Soil pH is a measure of soil acidity ($\text{pH} < 7$) or alkalinity ($\text{pH} > 7$). Soil pH levels that are too high or too low lead to deficiency in many nutrients, decrease in crop yield, and decline in soil biological activity.
- **Electrical Conductivity (EC)**. Soil electrical conductivity (EC) is a measure of the amount of salts in soil (salinity of soil). EC that is too high can reduce crop yields and even prevent some crops from growing. It reduces water and nutrient availability for both plants and soil organisms.

Further reading:

[Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems](#)

[Soil Health | NRCS Soils](#)

[Soil Health Card | NRCS Soils](#)

J.E. Herrick et al, "[A strategy for defining the reference for land health and degradation assessments.](#)" Ecological Indicators 97: 225-230.