

Haney Report Definitions:

1:1 Soil pH: The pH of the soil using a 1:1 ratio of soil and water. We may have to add lime to adjust pH if the value is below 5.5 for most crops.

1:1 Soluble Salts (EC): A measure of the electrical conductivity of the soil based on the amount of soluble salts at a 1:1 ratio of soil and water expressed as mmho/cm.

Organic Matter: This is the total soil organic matter expressed as percent loss on ignition (%LOI).

Solvita/One Day C/Microbial Activity: This number is ppm CO₂-C released in 24 hours by soil microbes after soil has been dried and rewetted. This is a measure of microbial activity in the soil and is highly related to the fertility of the soil. In general the higher the number the better. This value can range anywhere from about 0 to over 400, but we typically don't see values higher than 200 for most soils and management scenarios. The rankings would be as follows:

0-15 Very Low
15-30 Low
30-50 Slightly below average
50-70 Slightly above average
70-100 High
100+ Very High

Notice that we do not list a true average because these rankings are on a sliding scale, which is dependent on soil types and climate. Sandier soils or dryer climates tend to score poorer. Therefore, we need to focus on the relative differences between samples and track change in time as a response to management rather than be entirely focused on one number.

Total Nitrogen: The total water extractable N (WEN) from your soil expressed in ppm.

Organic Nitrogen: Organic N is the total water extractable N (WEN) minus inorganic N (NO₃ and NH₄) in ppm. The organic N pool is replenished by fresh plant residues, manure, composts, and dying soil microbes.

Total Organic Carbon: The total water extractable organic C (WEOC) from your soil expressed in ppm. This pool of carbon is roughly 80 times smaller than total soil organic C pool (% organic matter) and reflects the energy/food source that is driving your soil microbes.

Nitrate-N: The amount of NO₃-N extracted from your soil using H3A extractant expressed in ppm N.

- Ammonium-N:** The amount of NH₄-N extracted from your soil using H3A extractant expressed in ppm N.
- Inorganic Nitrogen:** This is a sum of the NO₃-N and NH₄-N expressed in ppm N.
- Inorganic Phosphorus:** The amount of P in your soil extracted with H3A and measured as orthophosphate (PO₄-P) expressed in ppm P.
- Total Phosphorus:** Total P is the amount of elemental P in your soil extracted with H3A and analyzed on ICAP in ppm P.
- Organic Phosphorus:** Organic P is the total P minus inorganic P expressed in ppm P. This represents P that is not currently plant available but may become available through microbial activity.
- ICAP Potassium:** Is the total elemental K in your soil expressed as ppm K.
- ICAP Calcium:** Is the total elemental Ca in your soil expressed as ppm Ca.
- ICAP Aluminum:** Is the total elemental Al in your soil expressed as ppm Al.
- ICAP Iron:** Is the total elemental Fe in your soil expressed as ppm Fe.
- Organic C:Organic N:** This is the ratio of organic C to organic N in your soil based on a water extraction. This number is used in conjunction with the Solvita CO₂-C number to estimate potential N and P mineralization. It is also used in the soil health calculation. This number is a very sensitive indicator of the health of your soil and has a significant impact on the activity of soil microbes. We like to see number **below 20**. When the value is above 20, we will suggest a higher percentage of legumes in the system to help build organic N and lower the ratio over time. Ideally, we want to see this value between 8 and 15 and we consider it to be perfect between 10 and 12.
- N - Mineralization:** The amount of N being released through mineralization expressed in ppm N. The N_{min} estimates how much N will be immediately available to the crop based on microbial activity and the organic C:organic N value. When the organic C:organic N value is above 20, N will remain tied up in the bacterial biomass and won't be released until the cell dies.
- Organic N Release:** The total amount of N being released through microbial activity from the organic N pool expressed as ppm N. It is the sum of MAC WEON, which is the fraction of the organic N pool acted upon by the microbes over 24 hours, and N mineralization. This value typically increases as the soil system gets healthier.

- Organic N Reserve:** The amount of N left in the organic N pool in ppm N following the release by microbes. The organic N reserve or organic N pool is replenished by fresh plant residues, manure, composts, and dying soil microbes.
- P - Mineralization:** The amount of P that will be released through mineralization of organic P by soil microbes depending on their activity and the organic C:organic N ratio expressed in ppm P.
- Organic P Reserve:** Organic P reserve is the amount of P that remains in the organic P pool following the release by microbes expressed in ppm P.
- % P Saturation Al/Fe:** % P saturation is the amount of P divided by the amount of Fe and Al extracted from your soil. Number below 5 may indicate the need for P fertilizer.
- Soil Health Calculation:** This number is calculated as 1-day CO₂-C divided by organic C:N ratio plus a weighted organic carbon and organic N addition. It summarizes the overall health of your system based on the indicators measured in the test. The score typically ranges anywhere from about 0-30. We like to see this number **above 7** in most situations, but not all soils have the same potential when it comes to the soil health score. The best way to get started is to establish a baseline of where your farm is right now. Then find one or two soils in the area (neighbor or down the road) that you think are in poor soil health based on your own observations or definitions. Then find a soil that you define as being in the best health. Try to look beyond yield when defining soil health, so this might be a fencerow or a tree line or a well-managed perineal pasture. The goal is to establish your own range based on your area's general climate and soil types. This will also tell you where you have progressed from if you have been trying different tactics aimed at improving soil health, but it will also allow you to set some goals and realistic expectations. Again, not every soil has the same potential. Keeping track of this number will allow you to gauge the effects of your management practices over the years.
- Cover Crop Mix:** This is a suggested cover crop planting mix recommendation based on your soil test data, the soil health score, and the organic C:N ratio. It is designed to provide your soil with a mixed species cover crop to help you balance the C:N ratio and feed the soil microbes to improve your soil health.
- Nitrogen, lbs N/acre:** Pounds of plant available N per acre in soil. This value includes the inorganic N measured as nitrate and ammonium and the amount of N expected to be released from the organic N pool by microbial activity.
- Phosphorus, lbs P₂O₅/acre:** Pounds of plant available P₂O₅ per acre. This value includes the inorganic P measured as orthophosphate and the amount of P expected to be released from the organic P pool by microbial activity.

Potassium, lbs K₂O/acre: Pounds of plant available K₂O per acre.

Nutrient Value, \$/acre: Is the estimated value of the plant available NPK in your soil based on common fertilizer prices.

Traditional N Evaluation: This number reflects the amount of N in lbs per acre that would have been measured using a more traditional soil test where NO₃-N was the only test used for N evaluation.

Haney Test N Evaluation: This number is the same as plant available N in lbs per acre and represents the amount of N measured with the Haney Test methods. It includes NO₃-N, NH₄-N, and the organic N release.

Lbs N difference: Is the difference in the amount of N in lbs per acre between the Haney Test and a traditional soil test using NO₃-N. This value typically increases with positive gains in soil health.

N Savings: Is the amount of money saved on N application per acre based on the difference of N measured using the Haney Test and current N prices.