

Interpretation Guide for Soil Analysis

The Basics:

These metrics are important not only on their own but also for their influence on other soil characteristics and metrics.

Metric	Target
Soil Texture (General)	Only compare sites with similar soil texture (% sand, % silt, % clay). When texture is similar, the unmanaged site defines the potential of the other site(s).
% Sand	In soil with more than 50% sand, expect organic matter (OM) to be lower.
% Clay	In soil with more than 50% clay, expect organic matter (OM) to be higher.
Organic Matter (OM)%	More is better – when soil texture is similar, the unmanaged site show the potential. If % sand is similar between sites, then the unmanaged site is the target.
Cation Exchange Capacity (CEC) (meq/100g)	CEC is influenced by both texture and cations (positively-charged nutrients). This is a benchtop calculation of the cations. Soils with different CECs have different expected ranges for many nutrients (see below).
pH	A target for soil pH is 6.2 - 6.8 EXCEPT for potatoes and blueberries. Too low pH inhibits Ca, Mg, P, K, Mo. Too high pH inhibits P, Fe, Mn, Cu, B. Low pH can lead to Al toxicity. Increasing OM % will buffer pH and increase beneficial organisms.
Buffer pH	Indicates how stable pH is and is used to calculate lime amendments.

Physical and Biophysical Characteristics of Soil:

Metric	Notes
Wet Ag Stability (%)	A higher percentage is better.
Water Infiltration (sec)	Measures effective precipitation. Average of 3 rings, 1 pour only with 1" equivalent. Faster is better. More pore space, more capacity.
Bulk Density (g/cm ³)	Ideal range 1.0 to 1.4 g/cm ³ . Sand lower than clay.
Compaction at 200 psi (depth in inches)	Greater depth at 200 psi is better.
Compaction at 300 psi (depth in inches)	Plant roots cannot penetrate soil that has compaction at 300 psi or more. At a minimum, target less than 50% of readings below 300 psi within the top 6 inches of soil. No compaction within the top 6" is ideal.
Active Carbon (ppm)	More is better. More food for microbes to eat.
C:N (ratio)	Soil range is 10:1.
Respiration (mg CO ₂ /g)	A higher measurement is better.
Total Nitrogen	Ideal range.
Total Carbon	More is better.
Total Organic Carbon	More is better (higher proportion of carbon that is stored in the soil).
Organic Carbon (T/ha)	Adjusted for bulk density. Proportion of carbon stored in the soil in fixed form.

Macro- and Micro-Nutrients in Different Soil Textures

A soil's capacity for retaining many macro- and micro-nutrients differs between soil texture/CEC. Target/expected ranges for nutrients are presented by CEC below.

	Soil Type	Sandy	Silty	Clayey	Notes
	C.E.C	0 - 8	9 - 25	26 +	
Phos ppm (Bray-P1)	P Bray	41 - 65	31 - 50	21 - 40	Range for optimal plant growth. Excesses impact plant growth, environment, and profit.
Potassium (K ppm)	K	101 - 175	151 - 250	201 - 350	Range for optimal plant growth. Compare to plant tissue.
Magnesium (Mg ppm)	Mg	51 - 200	101 - 200	201 - 600	Range for optimal plant growth.
Calcium (Ca ppm)	Ca	501 -1250	1001 - 3000	2001 - 6000	Range for optimal plant growth.
% K (Potassium)	% K	3.5 - 5	2 - 4	2 - 3	
% Mg (Magnesium)	% Mg	10 - 20	10 - 20	8 - 20	
% Ca (Calcium)	% Ca	60 - 80	60 - 80	60 - 80	
% Na (Sodium)	% Na	< 1%	< 1%	< 1%	Greater Na will negatively impact plant growth.