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## Soil Test Interpretation Quick Guide

### Saline and Sodic Soils

Salinity and sodicity are two related but distinct terms to describe salt-affected soils. Salinity is the overall abundance of soluble salts, which compete with plant water uptake and reduce crop productivity. Sodicity specifically refers to high sodium concentration in soil that destroys soil structure, resulting in poor water movement, poor trafficability, and soil compaction.

Saline soils are often called “salty,” “sour,” or “white alkali.” Sodic soils are sometimes called “black alkali.” Depending on which type of salt-affected soil you have, the appropriate soil management strategy classifies the salt-affected soil type simply requires the routine soil test report (Table 1).

**Table 1. Salt-affected soil classification using a routine soil test report.**

		Extractable sodium percentage, %Na	
		<5%	>5%
Soluble salts (EC 1:1), dS/m	<1.0	normal	sodic
	>1.0	saline	saline-sodic

#### Salt-affected Soil Management Options

Saline soils have an overall abundance of soluble salts. There is nothing you can add to make the salts disappear, such as the faulty suggestion to apply gypsum (another salt). Effective saline soil management options include: 1) choose salt-tolerant crop species, 2) plant salt-tolerant perennial grasses, and/or 3) improve soil water drainage (tile) to leach soluble salts.

Sodic soils have low soluble salts yet high sodium concentration. A soluble calcium source, like gypsum, is required to reduce soil swelling and dispersion. Effective sodic soil management strategy requires: 1) apply soluble calcium amendment and 2) improve soil water drainage (tile) to leach sodium.

Saline-sodic soils have high soluble salts and high sodium concentration, which are managed in two phases. Effective saline-sodic soil management targets salinity first, often with salt-tolerant perennial grasses and tile drainage. Once soluble salts (EC 1:1) are less than 1.0 dS/m, then apply soluble calcium amendment (gypsum). The calcium amendment may be applied initially, but it is not required to maintain soil structure until salinity is lowered.

Salt-affected soils develop over many years, often decades. Reclaiming a salt-affected soil for crop production will similarly require many years. Regardless of the strategy you choose, the most important ingredient is time. Under the best leaching conditions, even tile drainage may require 10 to 15 years before soil salinity decreases below 1.0 dS/m. Proper soil water management and time are key.

#### Suggested Resources

Franzen, D., C. Gasch, C. Augustin, D. Thomas, N. Kalwar, and A. Wick. 2019. Managing saline soils in North Dakota. NDSU Ext. Circ. SF1087 (revised). North Dakota State Univ., Fargo, ND. <https://www.ag.ndsu.edu/publications/crops/managing-saline-soils-in-north-dakota>

Franzen, D., N. Kalwar, A. Wick, and T. DeSutter. 2019. Sodicity and remediation of sodic soils in North Dakota. NDSU Ext. Circ. SF1941. North Dakota State Univ., Fargo, ND. <https://www.ag.ndsu.edu/publications/crops/sodicity-and-remediation-of-sodic-soils-in-north-dakota>