



Salinity and Sodic Soil Management Fact Sheet

Applies to conservation practice 610 – Salinity and Sodic Soil Management

USDA Natural Resources Conservation Service - North Dakota

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Healthy crop was harvested from non-saline area in background. White area is foxtail barley which has high salt tolerance. Moderately salt-tolerant kochia is bright green. Bare ground is strongly saline.



Saline seep occurs on hillside where excess groundwater evaporates, leaving salt at the soil surface. Excess groundwater is result of fallow or low-water use crops grown on the recharge site, usually higher in landscape.

What is Salinity and Sodic Soil Management?

Salinity and Sodic Soil Management is the management of land, water and plants to control and minimize accumulations of salts and the effects of sodium in the rooting zone.

How it helps: The practice is intended to improve soil quality or plant productivity, or to convert unproductive cropland to suitable permanent vegetation. Where salinity problems are human-induced, the practice is intended to halt or reverse the adverse movement of salts due to excess groundwater. The practice can also help reduce soil crusting and improve permeability caused by sodic soils.

In addition to treating areas adversely affected by salts or sodicity, this practice also is applicable to treating saline seep recharge areas. In a recharge area, water in excess of the water holding capacity of the soil moves below the root zone, raising the local water table. The groundwater then flows downward and laterally, dissolving and transporting salts which eventually discharge near the surface. An improved water management system in the recharge area reduces this condition.

To apply this practice: The problem area must first be identified and delineated. Existing soil surveys delineate areas that are moderately to strongly saline or affected by sodium. Soil surveys and photographic tools can help identify other potential problem areas when field investigations are not possible.

Soils should be examined where salts are visible on the surface, vegetation is predominantly salt-tolerant, or vegetative growth is absent. Soil salinity can be determined on site by electrical conductivity meters or laboratory analysis of soil samples. Sodic soils can be identified in the field by NRCS employees or professional soil classifiers.

Treatment of salt- or sodium-affected areas usually involves planting permanent vegetation that is tolerant of saline or sodic conditions. Western wheatgrass, slender wheatgrass, and tall wheatgrass are commonly used to improve these areas. Other species such as alkali sacaton, hybrid wheatgrass (New-hy), beardless wildrye, sweetclover, alsike clover, or four-wing saltbush may also be suitable; contact NRCS for site-specific recommendations.

Immediately after planting permanent vegetation, applying mulch* to the area may be recommended to reduce evaporation. Reduced evaporation in turn reduces the additional accumulation of salts at the soil surface, which may aid seed germination and survival of desired species.

* Refer to conservation practice Mulching – 484.

To treat saline areas, artificial drainage may be used to remove excess ground water and accompanying salts. This approach is rarely used due to cost or lack of an acceptable outlet for the saline water. Refer to conservation practice Subsurface Drain – 606 and comply with applicable local, State, Tribal, and Federal drainage regulations.

Sodic soils can be treated with chemicals, but it is usually cost-prohibitive.

Recharge areas (areas that contribute additional water to saline seeps) are treated by growing deep-rooted perennial vegetation to help lower the water table. Growing alfalfa on recharge areas is particularly effective due to its deep rooting trait and long growing season. If years of groundwater monitoring indicate a lowering of the local water table, it may be acceptable to change from permanent vegetation to a crop rotation dominated by deep-rooted, high water use crops such as sunflower.

Details for implementing this practice are recorded in the Salinity and Sodic Soil Management Design and Installation Guide and the Standard in the Field Office Technical Guide. From the http://efotg.nrcs.usda.gov/efotg_locator.aspx?map=ND Web site, select the county of concern and then proceed to Section IV- Conservation Practices – Salinity and Sodic Soil Management subfolder.

Maintaining the practice - Salinity and Sodic Soil Management: Fields planted to permanent vegetation for this practice need to be managed according to a site-specific plan developed along with the grass/legume seeding plan. Long-term maintenance is achieved with management practices such as Forage Harvest Management – 511, Prescribed Grazing – 528, Wildlife Upland Habitat Management – 645, or Conservation Crop Rotation – 328.

Where to get help: Contact your local NRCS office for a site-specific plan.