JOB SHEET

Soil Salinity Management – Nonirrigated

Oklahoma Conservation Practice Job Sheet ***571***

USDA Natural Resources Conservation Service (NRCS) **August, 2003**

Landowner_____

WHAT IS SOIL SALINITY MANAGEMENT?

Soil Salinity Management is the management of nonirrigated land, water, and plants to control soil water movement and to minimize accumulations of salts on the soil surface and in the root zone of saline seep areas.

PURPOSE

Soil Salinity Management is used to promote desired plant growth in nonirrigated saline seep areas.

HOW IT HELPS THE LAND

This practice can help reclaim land where saline seeps have increased salt concentrations in the plant root zone.

WHERE THE PRACTICE APPLIES

This practice applies to nonirrigated land where a combination of factors such as topography, soils, geology, precipitation, vegetation, landuse, and cultural/structural practices can increase the extent and soluble salt concentrations of saline seep areas.

WHERE TO GET HELP

For assistance with this practice, contact your local Natural Resources Conservation Service or your local Conservation District office.

APPLYING THE PRACTICE

Saline Seeps

Saline seeps are intermittent or continuous saline water sites that discharge at the soil surface. They occur downslope from a recharge area on cropland.

Saline areas will develop white crusts on the soil surface as water evaporates from the soil profile during dry periods. Normal crop growth is inhibited due to the salt concentration in the plant root zone. Seed germination and early seedling stages are particularly effected.

Saline soils will have a very good physical condition throughout the tillage zone. The soil will be friable, mellow, and easily tilled. Soil which has been saline for several years is generally very fertile having high N, P, and K soil analysis. These nutrients tend to build up due to the lack of vegetation grown on the site.

Identifing the Problem

There are a number of reasons some soils loose their productive capablities. One reason is that salt concentrations can buildup in the soil profile and make the soil less desirable for plant growth. These soils can be either saline or alkali (sodic). Both display very similar visual characteristics but require different treatments for resolve.

Saline seeps will have the following characteristics:

1. The saline area has been accelerated by dryland farming practices
2. They are recent and local in origin
3. They develop a white crust on the soil surface
4. The water table is within 8 feet of the soil surface (often within 3 ft. of the soil surface)
5. The soil Electrical Conductivity (EC) is greater than 4 mmhos/cm at 25^{o}C in the top 6 inches of soil
6. The soil EC will decrease with soil depth
7. The soil pH is less than 9
8. Groundwater salinty is generally 4000 micromhos or greater (2600 ppm soluble salts)

The soil in the saline seep area can be tested in one of the following two ways:

1. Have a soil scientist evaluate the soil in the seep area with a salinity meter

or

2. Have soil samples analyzed for salinity at the OSU lab or any other lab that uses the same testing procedures and approved by the North American Proficiency Testing Program

Soil samples will need to be collected in accordance with OSU Fact Sheet 2207 – How to Get a Good Soil Sample. A salinity management analysis will be done on the soil sample. This analysis includes results for Na, Ca, Mg, K, B, Electrical Conductivity (EC), Total Soluble Salts (TSS), Sodium Adsorption Ratio (SAR), Exchangeable Sodium Percentage (ESP), and pH. It is best to sample during a dry period of the growing season and should be taken at least one week after the last rain. Samples should only be taken from the top 1 to 3 inches of soil (seeding depth).

Recharge Area

Saline seeps are caused by water escaping the plant root zone in the recharge area and moving downslope until appearing near or on the soil surface. Before the saline seep area can be reclaimed, groundwater flow from the recharge area must be greatly reduced or eliminated. Most treatments for controlling the saline seep will be applied to the recharge area.

The size of the recharge area needs to be determined by a soil scientist and delineated on an aerial map. Recharge areas are generally within 2000 ft. of the seep and will always be at a higher elevation on the landscape.

Plants that are adapted to the site should be planted in the recharge area. At least 80% of the recharge area should be planted to a perennial grass or legume species.

Where practicable, divert run-on water and/or install surface and/or subsurface drainage to minimize water infiltration and decrease soil water in recharge areas.

Saline Seep Area

Plants that produce satisfactory yields under the existing salinity should be used in the seep area. Adapted vegetation may be established in saline seep areas at the same time as the recharge area but can be done after water tables have been lowered sufficiently to prevent capillary movement of water and salts into the root zone and soil surface. Perennial grass and legume species are preferred.

CONSIDERATIONS

Locate snow fences, structures or vegetation that traps or accumulates moisture away from the recharge area.

Plant trees and shrubs in the recharge area to utilize excess soil moisture.

Maintain perennial vegetation in the recharge area indefinitely while growing annual crops in the saline seep area. Once the water table in the saline seep area has been lowered and movement of water and salts in the root zone has been reduced, annual crops may be planted in the seep area.

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