USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

SOIL AND PLANT SCIENCE DIVISION

# Technical Soil Services

North Central Soil Survey Region

## Dickinson, North Dakota, Major Land Resource Area (MLRA) Soil Survey Office (SSO)

## Soil Survey Staff Assist Resource Soil Scientist with Soil Salinity and pH Workshop

### Purpose

Staff created this workshop to advance conservationists' understanding of soil pH and salinity and how to recognize these issues on the landscape. Resource Soil Scientist John Kempenich led the discussion with assistance from staff of the Dickinson, North Dakota, MLRA SSO.

### Background

Southwestern North Dakota soils are principally Mollisols. These soils, formed in shortgrass prairie conditions, have historically had neutral to slightly alkaline surface pH. However, the widespread use of commercial ammonium fertilizer, combined with the lack of an economically viable source of lime to counteract its effects, has caused the soil surface to become acidic. Because the area has historically had high pH levels, producers and conservationists are unfamiliar with identifying and treating low pH. Vegetation that can establish in these low pH areas is limited and typically unhealthy. These unhealthy plants are not using as much water, which can lead to excess water moving through the soil profile, carrying sodium from the residual parent material along with it. This excess sodium contributes to the salinization of lower landscape positions where the water outlets. The workshop location was a prime example of this relationship. There was limited up slope vegetation due to low pH, which may have exacerbated the salinity of the foot slope part of the landscape.

## Key Outcomes

Staff trained 30 participants from various field offices in Southwest North Dakota (fig. 1). Staff demonstrated how to identify low pH and saline soils and how to use pH and electrical conductivity meters and their calibration (fig. 2). After the training, participants relayed to staff that they felt more confident in identifying low pH and saline areas. One participant stated that she believed some of her failed grass seedings may be due to low pH, and she was going to use her newly calibrated pH meter to assist with determining the cause.

Figure 1.—Resource Soil Scientist John Kempenich discusses salinity and water movement to field office staff.

Figure 2.—The left side of the picture shows vegetation growing in soil around a pH of 5.5. The right side shows a pH of around 3.9. Note the abrupt and patchy nature of the low pH areas.

USDA is an equal opportunity provider, employer, and lender.