

Natural Resources Conservation Service

Soil and Plant Science Division

Soil Survey Region 10



Bismarck, North Dakota MLRA Soil Survey Office

USDA-NRCS and the USDA-ARS-Northern Great Plains Research Laboratory Collaborate on Dynamic Soil Properties Projects at the Soil Health Demonstration Farm

Purpose

North Dakota soils staff, Soil and Plant Science Division staff from soil survey Regions 5 and 10, and scientists from the USDA-ARS-Northern Great Plains Research Laboratory (NGPRL) in Mandan, North Dakota recently collaborated on two long-term dynamic soil property projects. Comparable results for dynamic soil property (DSP) sampling requires the collection of soils from the same landscape position and soil series. DSP projects require a central pedon along with several satellite pedons. To consistently sample the same soil series, a method for predicting its spatial location is necessary, so Senior Soil Scientist Kyle Thomson utilized geospatial tools and terrain data to locate the same soil series across a sampling area.

Methods

High-resolution elevation data is available for all areas in North Dakota. Just as in digital soil mapping, elevation data can be used to make predictions as to where similar soils occur. This process was used for two DSP projects, one in Morton County, and the other in Burleigh County. The first step in the process is to develop terrain datasets from the elevation data using any number of GIS packages. Next, the terrain datasets are classified into an equal number of classes. The classified datasets are then combined into a single dataset. This dataset is then used to determine locations that have the same terrain attributes. By selecting pixels in the combined dataset to identify sampling locations ensures that they have the same terrain data and are likely to be the same soil series.

Key Outcomes

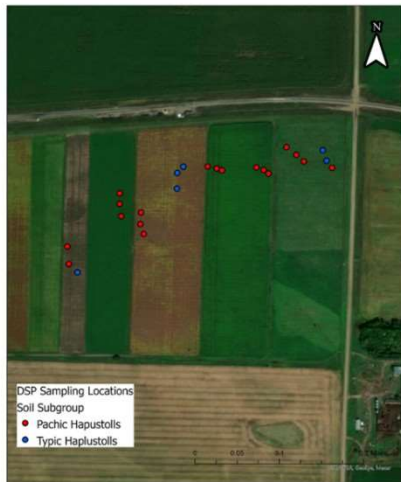
After soil sampling was completed, the soil subgroup found was largely consistent across each DSP project area. Both areas found the same soil subgroup in 80% of the sampling locations, as seen in the following tables.

Morton County, ND		Burleigh County, ND	
Typic Haplustolls	12	Pachic Haplustolls	24
Pachic Haplustolls	3	Typic Haplustolls	6

This method proved to be effective in selecting similar soils and associated sampling points required for a DSP project. This process greatly increases the efficiency of locating similar soils and sampling points by reducing field time assessing sampling point locations. This process works well in the absence of a raster soil survey. However, where raster soil survey products are available, they should be used in lieu of this process because raster soil surveys do a better job of finding similar soil series.



Menoken Farm Dynamic Soil Property Sampling



Sampling points, Menoken Soil Health Demonstration Farm, ND.



ARS Soil Scientist Mark Liebig collects soil cores.



Wade Bott, State Soil Scientist, Bismarck, ND and Roberto Luciano, Resource Conservationist, work to describe and classify the soil at a sampling point located at the USDA-ARS-Northern Great Plains Research Laboratory (NGPRL), Mandan, North Dakota.



Perry Sullivan, Soil Survey Office Leader (Region 10), John Kempenich, Senior Soil Scientist (Region 5), Jeanne Heilig, Soil Scientist Office Leader (Region 5), and Wade Bott, ND State Soil Scientist, describe and classify soil at the Menoken Soil Health Demonstration Farm, Bismarck, ND.