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NEON Site Level Plot Summary
North Sterling (STER)

Document Information

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Site Background

The North Sterling (STER) site is near Sterling, Colorado. The site is in Major Land Resource Area (MLRA) 72 – Central High Tableland, near the boundary of MLRA 67B – Central High Plains, Southern Part. The site consists of 802 acres and is located in the dissected plains of the Colorado Piedmont.

Site Information

Elevation ranges from approximately 4,440 feet to 4,510 feet above sea level.

The parent materials at the STER site are eolian deposits, loess, recent alluvium, and Tertiary aged alluvium.

Land use is dominated by non-irrigated cropland, with a few areas of pastureland.

Major crops include dry land corn, winter wheat, triticale, and millet. The plant community in the pastureland is dominated by blue grama, buffalo grass, western wheatgrass, needle and thread, and sand dropseed.

Major soil series on the site include Weld, Rago, Wagonwheel, Stoneham, Colby, Albinas, Kuma, Platner, and Wages.

Landforms that these soils occur on are hillslopes, interfluves, and drainageways.

Analysis of Plots for Sampling

Soil map unit and landform were the two major features considered for plot selection; slope and geology were used to a lesser extent. Each plot was chosen based on best representation of the landform and potential to sample the representative series located on the site. Soil mapping

consisted of 10 different map units, but the pre-selected sampling plots occurred in only 5 of the map units. The analysis resulted in 11 plots being selected for field description, field sampling, and lab characterization. The 5 plots not sampled either occurred in non-typical settings or were duplicates of one of the 11 chosen plots.

Roughly 25 percent of the NEON site area (50% of the site's total map units) at STER consisted of map units that were not sampled. These included:

Map Unit Symbol	Map Unit Name	% Total Site Area
1	Albinas loam, 0 to 3 percent slopes	14
52	Kuma loam	6
89	Platner loam, 0 to 3 percent slopes	1
90	Platner loam, 3 to 5 percent slopes	3
120	Wages loam, 5 to 9 percent slopes	1
	Total	**25**

Sampled map units represented approximately 75 percent of the NEON site area (50% of the site's total map units):

Map Unit Symbol	Map Unit Name	% Total Site Area
92	Rago loam	20
110	Wagonwheel-Stoneham complex, 2 to 5 percent slopes	17
111	Wagonwheel-Colby-Stoneham, association, 5 to 12 percent slopes	15
119	Wages loam, 3 to 5 percent slopes	3
126	Weld loam, 1 to 3 percent slopes	20
	Total	**75**

The plots selected for soil sampling are representative of the map units in which they occur. Seventy-three percent fall within the Range in Characteristics (RIC) of the individual major component or minor component, with the exception of a few outliers (noted below). The random spatial design underlying the NEON plot selection process did not capture the representative landform positions within map units, missed fifty percent of the map units mapped on site, and missed much of the recent alluvium on the site. These areas are important for establishing the variability of the soils across the landscape of the STER site.

The plots selected for soil sampling are representative of the landform and parent material of the map unit in which they occur. Thirty-six percent of the plots (four) correlate to a major component (or similar soil) of the map unit from which they were sampled, the remainder (seven) correlate to a minor component (or similar soil). A major component makes up greater than or equal to twenty percent of the map unit composition, while a minor component makes up

less than twenty percent of the map unit composition. A similar soil is a soil that is outside the Range in Characteristics (RIC) of a soil series, but does not correlate to any other existing series. The details of the plots that do not fit the RIC of a soil series are listed below in the Summary of Soils section.

The random spatial design underlying the NEON plot selection process did not capture fifty percent of the total map units on site. The design also missed the drainageway landform that bisects the site and missed much of the recent alluvial parent material on the site; these two areas represent the only non-cropland (pastureland) on the site. These areas are important for establishing the variability of the soils and landuse across the landscape of the STER site.

Plot Findings

The 11 pedons sampled represent 5 of the 10 total soil map units on site. The major components are Colby, Kuma, Platner, Rago, Sampson, Stoneham, Wages, and Weld. All of the plots sampled were cropland (100%). The small percentage of pastureland did not include a plot to sample.

Landforms – Plot STER_006 is found in a drainageway between the surrounding interfluves and hillslopes. Plots STER_018, 035, 027, 034, 032, 005, 010, and 028 are found on interfluves with varying two dimensional (summits, shoulders, footslopes) and three dimensional (sideslope, interfluve, baseslope) geomorphic components. Plots STER_029 and STER_033 are found on toeslopes of the baseslopes of hills.

Parent Materials – Plots STER_006 and STER_010 were formed from alluvium. Plots STER_018, STER_029, and STER_033 were formed from eolian deposits and/or local alluvium. Plots STER_035 and STER_034 were formed from eolian deposits. Plots STER_027, STER_032, STER_005, and STER_028 were formed from loess. Sampled plots were 37% loess, 27% eolian deposits and/or local alluvium, 18% eolian deposits, and 18% alluvium.

Summary of Soils

The intention was to sample the following series: Weld, Wagonwheel, Colby, Stoneham, Rago, and Wages. The most common soil series were the Weld (2 samples), Colby (2 samples), and Sampson (2 samples) series. The Kuma series (1 sample), Stoneham series (1 sample), Platner series (1 sample), Rago series (1 sample), and the Wages series (1 sample) make up the remaining samples.

The Weld soils are located on interfluves and formed from loess (STER_018 and STER_005). These soils have a mollic epipedon and a very well developed subsoil that has a clay increase (i.e. an argillic horizon). They have a fine particle size class, with field estimates of clay ranging from 36 to 38 percent clay in the particle size control section. Of the two pedons sampled as Weld, one is outside the normal range of characteristics. STER_005 has a calcic horizon within

100 centimeters of the soil surface; the Weld series does not allow for a calcic horizon. STER_018 came from a minor component position in a Rago loam map unit.

The Colby soils are located on the shoulders and backslopes of hills and/or the sideslopes of interfluves (STER_035 and STER_034). They formed from loess. These soils have an ochric epipedon and typically have very little soil development in the subsoil. They contain calcium carbonates throughout the profile and have a fine-silty particle size control section. Both of the pedons sampled as Colby are outside the normal range of characteristics. STER_034 has a coarse-loamy particle size class, a more developed subsoil, and has a calcic horizon within 100 centimeters of the soil surface; the Colby series does not allow for much soil development in the subsoil, nor does it allow for a calcic horizon or a coarse-loamy particle size class. STER_035 also has a coarse-loamy particle size class and a more developed subsoil than the Colby series allows. Two of these features, soil development and a calcic horizon are common issues found in the Colby series in MLRA 67B and are currently under investigation to determine if these soils are truly the Colby series or another series. Both of these samples came from a map unit that has the Colby series listed as a major component or as a minor component of the map unit.

The Sampson soils are located in drainageways or on the toeslopes of hills and/or the baseslopes of interfluves (STER_033 and STER_006). They formed from local alluvium derived from eolian deposits. These soils have a thick mollic epipedon (greater than 50 centimeters thick) and a well-developed subsoil that that has a clay increase (i.e. an argillic horizon). They have a fine-loamy particle size class, with field estimates of clay ranging from 32 to 33 percent clay in the particle size control section. Of the two pedons sampled as Sampson, one is outside the normal range of characteristics for the Sampson series. STER_006 has a calcic horizon within 100 centimeters of the soil surface; the Sampson series does not allow for a calcic horizon. Both of these samples came from a minor component position, one from the Rago loam map unit and the other from the Wagonwheel-Stoneham complex, 2 to 5 percent slopes map unit.

The Stoneham soils are located on interfluves and formed from loess (STER_027). These soils have an ochric epipedon and have a well-developed subsoil that has a clay increase (i.e. an argillic horizon). They have a fine-loamy particle size class, with a field estimate of 32 percent clay in the particle size control section. This one sample of the Stoneham soil is outside the normal range of characteristics for the Stoneham series. This sample has a calcic horizon within 100 centimeters of the soil surface; the Stoneham series does not allow for a calcic horizon. This sample was taken from a map unit of Wagonwheel-Colby-Stoneham association, 5 to 12 percent slopes.

The Rago soils are located in drainagways or on the baseslopes of the interfluves (STER_010). These formed from alluvium derived from eolian deposits of two separate ages. These soils have a thick mollic epipedon (greater than 50 centimeters thick) and a well-developed subsoil that has a clay increase (i.e. an argillic horizon). They have a fine particle size class, with a field estimate of 40 percent clay in the particle size control section. This sample came from a minor component position in the Weld loam, 1 to 3 percent slopes map unit.

The Wages soils are located on the backslopes of hills or the sideslopes of interfluves (STER_032). They formed from eolian deposits. These soils have a mollic epipedon and a well-developed subsoil that has a clay increase (i.e. an argillic horizon). They have a fine-loamy particle size class. This one sample of Wages is outside the normal range of characteristics for the Wages series. This sample has a fine particle size class and a calcic horizon within 100 centimeters of the soil surface; the Wages series does not allow for either of these features. This sample was taken from a map unit of Wages loam, 3 to 5 percent slopes.

The Platner soils are located on interfluves and formed from loess and/or eolian deposits (STER_028). These soils have a mollic epipedon and a very well-developed subsoil that has a clay increase (i.e. an argillic horizon). They have a fine particle size class, with a field estimate of 36 percent clay in the particle size control section. This pedon is outside the normal range of characteristics for the Platner series. This sample has a calcic horizon within 100 centimeters of the soil surface; the Platner series does not allow for a calcic horizon. This sample was taken from a minor component position in the Weld loam, 1 to 3 percent slopes map unit.

The Kuma soils are located on interfluves and formed from eolian deposits (STER_029). These soils have a thick mollic epipedon (greater than 50 centimeters thick) and have a well-developed subsoil that has a clay increase (i.e. an argillic horizon). They have a fine-silty particle size class, with a field estimate of 29 percent clay in the particle size control section. This sample was taken from a minor component position in the Rago loam map unit.