PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 9 2016
Describer: Jeanne Heilig;Perry Sullivan;Kyle Thomson
NEON Plot ID: NOGP_001
Site ID: S2016ND059001

Pedon ID: S2016ND059001
Site Note:
Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.
Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Parshall
Classification: Coarse-loamy, mixed, superactive, frigid Pachic Haplustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on toeslope of base slope of drainageway on plains
Upslope Shape: linear
Cross Slope Shape: concave
Particle Size Control Section: 25 to 100 cm.
Description origin: NASIS
Diagnostic Features: mollic epipedon 0 to 89 cm.
cambic horizon 89 to 160 cm.
secondary carbonates 160 to 200 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:
Pit Location:
Quad Name:
Std Latitude: 46.8059250
Std Longitude: -100.9156980
Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 353833 meters
UTM Northing: 5185379 meters
Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Grassland rangeland
Existing Vegetation:
Parent Material: alluvium derived from sandstone and shale
Bedrock Kind:
Bedrock Depth:
Bedrock Hardness:
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Cont. Site ID: S2016ND059001 **Pedon ID:** S2016ND059001

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
2.0	526.0	315	6.0			394	128	well		

A1--0 to 30 centimeters (0.0 to 11.8 inches); dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2), moist; 60 percent sand; 24 percent silt; 16 percent clay; weak medium subangular blocky parts to weak fine granular structure; soft, very friable, nonsticky, nonplastic; common very fine roots throughout and common fine roots throughout; many very fine tubular pores; 16.0 Percent Clay; 60.0 Percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 6.8, pH meter; clear wavy boundary.

A2--30 to 56 centimeters (11.8 to 22.0 inches); dark gray (10YR 4/1) fine sandy loam, very dark gray (10YR 3/1), moist; 60 percent sand; 24 percent silt; 16 percent clay; weak medium subangular blocky parts to weak fine granular structure; soft, very friable, nonsticky, nonplastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 16.0 Percent Clay; 60.0 Percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 6.8, pH meter; clear wavy boundary.

Bw1--56 to 89 centimeters (22.0 to 35.0 inches); brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3), moist; 68 percent sand; 19 percent silt; 13 percent clay; weak medium prismatic parts to moderate medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 13.0 Percent Clay; 68.0 Percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 7.1, pH meter; clear wavy boundary.

Bw2--89 to 140 centimeters (35.0 to 55.1 inches); light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2), moist; 65 percent sand; 19 percent silt; 16 percent clay; weak medium prismatic parts to weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine roots throughout; common very fine tubular pores; 16.0 Percent Clay; 65.0 Percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 7.1, pH meter.

Bw3--140 to 160 centimeters (55.1 to 63.0 inches); light olive brown (2.5Y 5/3) clay loam, olive brown (2.5Y 4/3), moist; 35 percent sand; 35 percent silt; 30 percent clay; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; 30.0 Percent Clay; 35.0 Percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter.

Bk--160 to 200 centimeters (63.0 to 78.7 inches); light olive brown (2.5Y 5/3) loam, olive brown (2.5Y 4/3), moist; 20 percent sand; 55 percent silt; 25 percent clay; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; carbonate, finely disseminated and 10 percent fine irregular weakly cemented carbonate masses throughout; 25.0 Percent Clay; 20.0 Percent Sand; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 10 2016
Describer: Jeanne Heilig;Perry Sullivan;Kyle Thomson;Brianna Wegner
NEON Plot ID: NOGP_003
Site ID: S2016ND059003

Pedon ID: S2016ND059003
Site Note:
Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.
Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Savage
Classification: Fine, smectitic, frigid Vertic Argiustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on footslope of base slope of hillslope on plains
Upslope Shape: convex
Cross Slope Shape: linear
Particle Size Control Section: 18 to 51 cm.
Description origin: NASIS
Diagnostic Features: mollic epipedon 0 to 29 cm.
argillic horizon 18 to 51 cm.
secondary carbonates 29 to 107 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:
Pit Location:
Quad Name:
Std Latitude: 46.8009920
Std Longitude: -100.9161150
Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 353788 meters
UTM Northing: 5184832 meters
Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Grassland rangeland
Existing Vegetation:
Parent Material: alluvium derived from shale and siltstone
Bedrock Kind:
Bedrock Depth:
Bedrock Hardness:
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Cont. Site ID: S2016ND059003 **Pedon ID:** S2016ND059003

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
8.0	527.0	270	6.0			394	128	well		

A--0 to 18 centimeters (0.0 to 7.1 inches); very dark grayish brown (10YR 3/2) silty clay loam, very dark brown (10YR 2/2), moist; 4 percent sand; 59 percent silt; 37 percent clay; moderate medium subangular blocky parts to moderate medium granular structure; moderately hard, firm, very sticky, very plastic; many very fine roots throughout; many very fine tubular pores; 37.0 Percent Clay; 4.0 Percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter; clear wavy boundary.

Bt--18 to 29 centimeters (7.1 to 11.4 inches); brown (10YR 4/3) silty clay loam, dark brown (10YR 3/3), moist; 4 percent sand; 59 percent silt; 37 percent clay; moderate medium prismatic parts to moderate medium subangular blocky structure; moderately hard, firm, very sticky, very plastic; many very fine roots throughout and common fine roots throughout; many fine tubular pores; 45 percent prominent 10YR 3/2), moist, clay films on all faces of peds; 37.0 Percent Clay; 4.0 Percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter; clear wavy boundary.

Btk--29 to 51 centimeters (11.4 to 20.1 inches); grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2), moist; 25 percent sand; 30 percent silt; 45 percent clay; moderate medium prismatic parts to moderate medium subangular blocky structure; moderately hard, firm, very sticky, very plastic; many very fine roots throughout and common fine roots throughout; many fine tubular pores; 40 percent prominent 10YR 2/2), moist, clay films on all faces of peds; carbonate, finely disseminated throughout; 45.0 percent Clay; 47.0 percent Sand; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.0, pH meter; clear wavy boundary.

Bk--51 to 107 centimeters (20.1 to 42.1 inches); light yellowish brown (2.5Y 6/3) clay loam, light olive brown (2.5Y 5/3), moist; 40 percent sand; 27 percent silt; 33 percent clay; moderate medium prismatic parts to moderate medium subangular blocky structure; moderately hard, firm, very sticky, very plastic; common very fine roots throughout and common fine roots throughout; common fine tubular pores; carbonate, finely disseminated throughout and 30 percent fine irregular weakly cemented carbonate masses throughout and 15 percent medium irregular weakly cemented carbonate masses throughout; 33.0 percent Clay; 50.0 percent Sand; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter; clear wavy boundary.

C--107 to 200 centimeters (42.1 to 78.7 inches); light olive brown (2.5Y 5/3) stratified fine sandy loam to clay loam, olive brown (2.5Y 4/3), moist; 40 percent sand; 30 percent silt; 30 percent clay; structureless massive; soft, friable, slightly sticky, slightly plastic; 10 percent fine irregular weakly cemented carbonate masses throughout; 30.0 Percent Clay; 50.0 Percent Sand; strong effervescence, by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter. The strong effervesence was only on carbonate masses. No finely disseminated carbonates in this horizon.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018

Description Date: Apr 29 2016

Describer: Perry Sullivan;Kyle Thomson;Jeanne Heilig;John Kempenich;Raven Chavez

NEON Plot ID: NOGP_006

Site ID: S2016ND059005

Pedon ID: S2016ND059005

Site Note:

Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota. Close proximity to the Tower Site made it necessary to sample this pedon with a bucket auger so soil structure was not visible and was not documented.

Lab Source ID:

Lab Pedon #:

Soil Name as Described/Sampled:

Classification:

Soil Name as Correlated: Temvik

Classification: Fine-silty, mixed, superactive, frigid Typic Haplustolls

Pedon Type: undefined observation

Pedon Purpose: research site

Taxon Kind: series

Associated Soils: Wilton

Physiographic Division: Interior Plains

Physiographic Province: Great Plains Province

Physiographic Section: Missouri plateau, glaciated

State Physiographic Area:

Local Physiographic Area:

Geomorphic Setting: on tread of terrace on plains

Upslope Shape: linear

Cross Slope Shape: linear

Particle Size Control Section: 25 to 100 cm.

Description origin: NASIS

Diagnostic Features: mollic epipedon 4 to 20 cm.
cambic horizon 20 to 51 cm.
secondary carbonates 51 to 101 cm.
lithologic discontinuity 101 to 158 cm.
lithologic discontinuity 158 to 185 cm.

Country:

State: North Dakota

County: Morton

MLRA: 54 -- Rolling Soft Shale Plain

Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota

Map Unit:

Pit Location:

Quad Name:

Std Latitude: 46.7689430

Std Longitude: -100.9170420

Latitude:

Longitude:

Datum: WGS84

UTM Zone: 14

UTM Easting: 353630 meters

UTM Northing: 5181273 meters

Primary Earth Cover: Grass/herbaceous cover

Secondary Earth Cover: Grassland rangeland

Existing Vegetation:

Parent Material: silty loess over till

Bedrock Kind:

Bedrock Depth:

Bedrock Hardness:

Bedrock Fracture Interval:

Surface Fragments:

Description database: MLRA10_StPaul

Cont. Site ID: S2016ND059005 **Pedon ID:** S2016ND059005

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
2.0	589.0	135	6.0			394	128	well		

Oi--0 to 4 centimeters (0.0 to 1.6 inches); slightly decomposed plant material; .

A--4 to 20 centimeters (1.6 to 7.9 inches); very dark gray (10YR 3/1) silt loam, black (10YR 2/1), moist; 5 percent sand; 69 percent silt; 26 percent clay; slightly hard, friable, moderately sticky, moderately plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 26.0 percent Clay; 5.0 percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 7.0, pH meter.

Bw1--20 to 35 centimeters (7.9 to 13.8 inches); light olive brown (2.5Y 5/3) silty clay loam, olive brown (2.5Y 4/3), moist; 5 percent sand; 63 percent silt; 32 percent clay; moderately hard, firm, moderately sticky, moderately plastic; common very fine roots throughout; common very fine tubular pores; 32.0 Percent Clay; 5.0 Percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 7.2, pH meter.

Bw2--35 to 51 centimeters (13.8 to 20.1 inches); light olive brown (2.5Y 5/3) silty clay loam, olive brown (2.5Y 4/3), moist; 5 percent sand; 57 percent silt; 38 percent clay; moderately hard, firm, very sticky, very plastic; common very fine roots throughout; common very fine tubular pores; 38.0 percent Clay; 5.0 percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter.

Bk1--51 to 72 centimeters (20.1 to 28.3 inches); grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2), moist; 8 percent sand; 56 percent silt; 36 percent clay; moderately hard, firm, very sticky, very plastic; few very fine roots throughout; few very fine tubular pores; carbonate, finely disseminated throughout and 3 percent fine irregular weakly cemented carbonate masses throughout; 36.0 percent Clay; 8.0 percent Sand; strong effervescence, by HCl, 1 normal; moderately alkaline, pH 8.0, pH meter.

Bk2--72 to 101 centimeters (28.3 to 39.8 inches); grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2), moist; 8 percent sand; 54 percent silt; 38 percent clay; moderately hard, firm, very sticky, very plastic; few very fine roots throughout; few very fine tubular pores; 3 percent fine distinct irregular 10YR 4/6), moist, masses of oxidized iron Throughout; carbonate, finely disseminated throughout and 4 percent medium irregular weakly cemented carbonate masses throughout; 38.0 percent Clay; 8.0 percent Sand; strong effervescence, by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter.

2Bk3--101 to 119 centimeters (39.8 to 46.9 inches); light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2), moist; 8 percent sand; 54 percent silt; 38 percent clay; moderately hard, firm, very sticky, very plastic; 5 percent coarse prominent irregular 10YR 5/8), moist, masses of oxidized iron Throughout; carbonate, finely disseminated throughout and 3 percent coarse irregular weakly cemented carbonate masses throughout; 1 percent nonflat subrounded indurated 2 to 75-millimeter Granite fragments; 38.0 percent Clay; 8.0 percent Sand; strong effervescence, by HCl, 1 normal; moderately alkaline, pH 8.3, pH meter. This 2Bk3 horizon is glacial till parent material.

2C1--119 to 158 centimeters (46.9 to 62.2 inches); light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2), moist; 15 percent sand; 51 percent silt; 34 percent clay; hard, very firm, moderately sticky, moderately plastic; 3 percent fine prominent irregular 10YR 5/8), moist, masses of oxidized iron Throughout; carbonate, finely disseminated throughout and 1 percent fine irregular weakly cemented carbonate masses throughout; 5 percent nonflat subrounded indurated 2 to 75-millimeter Granite fragments; 34.0 percent Clay; 15.0 percent Sand; slight effervescence, by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter. This 2C1 horizon is glacial till parent materials.

3C2--158 to 185 centimeters (62.2 to 72.8 inches); light yellowish brown (2.5Y 6/3) loam, olive brown (2.5Y 4/3), moist; 25 percent sand; 50 percent silt; 25 percent clay; soft, very friable, slightly sticky, slightly plastic; 25.0 percent Clay; 25.0 percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 3 2016
Describer: Jeanne Heilig;Perry Sullivan;Brianna Wegner
NEON Plot ID: NOGP_008
Site ID: S2016ND059007

Pedon ID: S2016ND059007

Site Note: Drainage is moderately well due to close proximity of this site to an intermittent creek. Numerous redoximorphic features in the soil at this site is due to a wicking effect from the water table of the creek up through the soil profile.

Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.

Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Golva
Classification: Fine-silty, mixed, superactive, frigid Typic Haplustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on footslope of base slope of ridge on plains
Upslope Shape: linear
Cross Slope Shape: linear
Particle Size Control Section: 25 to 100 cm.
Description origin: NASIS
Diagnostic Features: mollic epipedon 0 to 38 cm.
secondary carbonates 38 to 110 cm.
paralithic contact 186 to 200 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:
Pit Location:
Quad Name:
Std Latitude: 46.7833200
Std Longitude: -100.9081500
Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 354348 meters
UTM Northing: 5182854 meters
Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Grassland rangeland
Existing Vegetation:
Parent Material: silty alluvium derived from siltstone
Bedrock Kind: Siltstone
Bedrock Depth: 186 centimeters
Bedrock Hardness: very weakly cemented
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Top Depth (cm)	Bottom Depth (cm)	Restriction Kind	Restriction Hardness
186	200	bedrock, paralithic	Very weakly cemented

Cont. Site ID: S2016ND059007 **Pedon ID:** S2016ND059007

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
12.0	552.0	180	6.0			394	128	moderately well		

A--0 to 23 centimeters (0.0 to 9.1 inches); very dark grayish brown (10YR 3/2) silt loam, very dark brown (10YR 2/2), moist; 10 percent sand; 66 percent silt; 24 percent clay; moderate medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine roots throughout and common very coarse roots throughout and common fine roots throughout; many very fine tubular and common fine tubular pores; 24.0 Percent Clay; 10.0 Percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter; clear wavy boundary.

Bw--23 to 38 centimeters (9.1 to 15.0 inches); dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2), moist; 6 percent sand; 69 percent silt; 25 percent clay; moderate medium prismatic parts to moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common very fine roots throughout and common very coarse roots throughout and common fine roots throughout; common very fine tubular pores; 3 percent fine distinct irregular 7.5YR 4/6), moist, masses of oxidized iron Throughout; 25.0 Percent Clay; 6.0 Percent Sand; very slight effervescence, by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter; clear wavy boundary. Numerous redoximorphic features due to wicking effect of the water table of the creek upward through the soil profile. This pedon is adjacent to a small intermittent creek.

Bk1--38 to 67 centimeters (15.0 to 26.4 inches); light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2), moist; 6 percent sand; 69 percent silt; 25 percent clay; strong medium prismatic parts to moderate medium subangular blocky structure; moderately hard, firm, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; 10 percent fine distinct irregular 7.5YR 4/6), moist, masses of oxidized iron Throughout and 10 percent medium distinct irregular 7.5YR 4/6), moist, masses of oxidized iron Throughout; carbonate, finely disseminated throughout; 25.0 Percent Clay; 6.0 Percent Sand; strong effervescence, by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter; gradual wavy boundary. Numerous redoximorphic features due to wicking effect of the water table of the creek upward through the soil profile. This pedon is adjacent to a small intermittent creek.

Bk2--67 to 110 centimeters (26.4 to 43.3 inches); pale red (2.5YR 6/2) silt loam, dark grayish brown (2.5Y 4/2), moist; 6 percent sand; 69 percent silt; 25 percent clay; strong medium prismatic parts to moderate medium subangular blocky structure; moderately hard, firm, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; 1 percent fine distinct irregular 7.5YR 4/6), moist, masses of oxidized iron Throughout and 1 percent medium distinct irregular 7.5YR 4/6), moist, masses of oxidized iron Throughout and 25 percent fine distinct irregular 7.5YR 5/8), moist, masses of oxidized iron Throughout and 25 percent medium distinct irregular 7.5YR 5/8), moist, masses of oxidized iron Throughout; carbonate, finely disseminated throughout and 15 percent fine irregular weakly cemented carbonate masses throughout and 25 percent medium irregular weakly cemented carbonate masses throughout; 25.0 Percent Clay; 6.0 Percent Sand; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter. Numerous redoximorphic features due to wicking effect of the water table of the creek upward through the soil profile. This pedon is adjacent to a small intermittent creek.

BC--110 to 145 centimeters (43.3 to 57.1 inches); light yellowish brown (2.5Y 6/3) silt loam, light olive brown (2.5Y 5/3), moist; 6 percent sand; 69 percent silt; 25 percent clay; moderate medium prismatic structure; moderately hard, firm, slightly sticky, slightly plastic; 10 percent medium prominent irregular 10YR 4/6), moist, masses of oxidized iron Throughout and 20 percent fine prominent irregular 7.5YR 4/6), moist, masses of oxidized iron Throughout; 5 percent fine irregular weakly cemented carbonate masses throughout; 25.0 Percent Clay; 6.0 Percent Sand; slight effervescence, by HCl, 1 normal; moderately alkaline, pH 8.0, pH meter. Carbonate masses are effervescent but no effervescence in the soil matrix in this horizon. Numerous redoximorphic features due to wicking effect of the water table of the creek upward through the soil profile. This pedon is adjacent to a small intermittent creek.

C--145 to 186 centimeters (57.1 to 73.2 inches); light yellowish brown (2.5Y 6/3) silt loam, light olive brown (2.5Y 5/3), moist; 6 percent sand; 69 percent silt; 25 percent clay; massive; moderately hard, firm, slightly sticky, slightly plastic; 20 percent fine prominent irregular 10YR 5/8), moist, masses of oxidized iron Throughout and 20 percent medium prominent irregular 7.5YR 4/6), moist, masses of oxidized iron Throughout and 20 percent fine prominent irregular 7.5YR 4/6), moist, masses of oxidized iron Throughout and 20 percent medium prominent irregular 10YR 5/8), moist, masses of oxidized iron Throughout; 25.0 Percent Clay;

6.0 Percent Sand; noneffervescent, by HCl, 1 normal; moderately alkaline, pH 8.0, pH meter. Numerous redoximorphic features due to wicking effect of the water table of the creek upward through the soil profile. This pedon is adjacent to a small intermittent creek.

Cr--186 to 200 centimeters (73.2 to 78.7 inches); very weakly cemented Siltstone bedrock; .

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 9 2016
Describer: Jeanne Heilig;Perry Sullivan;Kyle Thomson
NEON Plot ID: NOGP_009
Site ID: S2016ND059008

Pedon ID: S2016ND059008
Site Note:
Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.
Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Savage
Classification: Fine, smectitic, frigid Vertic Argiustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on backslope of side slope of ridge on plains
Upslope Shape: concave
Cross Slope Shape: concave
Particle Size Control Section: 23 to 73 cm.
Description origin: NASIS
Diagnostic Features: mollic epipedon 0 to 23 cm.
argillic horizon 23 to 88 cm.
secondary carbonates 53 to 200 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:
Pit Location:
Quad Name:
Std Latitude: 46.8016220
Std Longitude: -100.9144730
Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 353915 meters
UTM Northing: 5184899 meters
Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Grassland rangeland
Existing Vegetation:
Parent Material: clayey alluvium derived from shale and siltstone
Bedrock Kind:
Bedrock Depth:
Bedrock Hardness:
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Cont. Site ID: S2016ND059008 **Pedon ID:** S2016ND059008

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
16.0	546.0	240	6.0			394	128	well		

A--0 to 23 centimeters (0.0 to 9.1 inches); very dark grayish brown (10YR 3/2) silty clay loam, very dark brown (10YR 2/2), moist; 5 percent sand; 57 percent silt; 38 percent clay; moderate medium subangular blocky parts to moderate medium granular structure; moderately hard, firm, very sticky, very plastic; many very fine roots throughout; many very fine tubular pores; 5.0 Percent Sand; 38.0 percent Clay; noneffervescent, by HCl, 1 normal; neutral, pH 7.2, pH meter; clear wavy boundary.

Bt--23 to 53 centimeters (9.1 to 20.9 inches); grayish brown (10YR 5/2) silty clay, dark grayish brown (10YR 4/2), moist; 5 percent sand; 47 percent silt; 48 percent clay; strong medium prismatic parts to strong medium angular blocky structure; hard, very firm, very sticky, very plastic; many very fine roots throughout; common very fine tubular pores; 80 percent prominent 10YR 3/1), moist, clay films on all faces of peds; 48.0 Percent Clay; 5.0 percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter; clear wavy boundary.

Btk--53 to 88 centimeters (20.9 to 34.6 inches); brown (10YR 5/3) silty clay, brown (10YR 4/3), moist; 4 percent sand; 41 percent silt; 55 percent clay; strong medium prismatic parts to strong medium angular blocky structure; hard, very firm, very sticky, very plastic; common very fine roots between peds; common very fine tubular pores; 80 percent distinct 10YR 3/2), moist, clay films on all faces of peds; carbonate, finely disseminated throughout and 25 percent fine irregular weakly cemented carbonate masses throughout; 55.0 Percent Clay; 4.0 percent Sand; strong effervescence, by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter; gradual wavy boundary.

C--88 to 200 centimeters (34.6 to 78.7 inches); grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2), moist; 4 percent sand; 46 percent silt; 50 percent clay; massive; hard, very firm, very sticky, very plastic; common very fine roots throughout; common very fine tubular pores; 5 percent fine irregular weakly cemented carbonate masses throughout and 2 percent medium irregular weakly cemented carbonate masses throughout; 2 percent nonflat angular strongly cemented 5 to 20-millimeter Ironstone nodules and 8 percent nonflat angular strongly cemented 2 to 5-millimeter Ironstone nodules; 50.0 Percent Clay; 4.0 Percent Sand; strong effervescence, by HCl, 1 normal; moderately alkaline, pH 8.0, pH meter.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 3 2016
Describer: Jeanne Heilig;Perry Sullivan;Brianna Wegner
NEON Plot ID: NOGP_012
Site ID: S2016ND059011

Pedon ID: S2016ND059011
Site Note:
Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.
Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Morton
Classification: Fine-silty, mixed, superactive, frigid Typic Argiustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on backslope of side slope of ridge on plains
Upslope Shape: linear
Cross Slope Shape: linear
Particle Size Control Section: 18 to 68 cm.
Description origin: NASIS
Diagnostic Features: mollic epipedon 0 to 18 cm.
argillic horizon 18 to 88 cm.
secondary carbonates 51 to 88 cm.
paralithic contact 88 to 200 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:
Pit Location:
Quad Name:
Std Latitude: 46.7859170
Std Longitude: -100.9160850
Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 353749 meters
UTM Northing: 5183157 meters
Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Grassland rangeland
Existing Vegetation:
Parent Material: fine-silty residuum weathered from shale and siltstone
Bedrock Kind: Shale and siltstone
Bedrock Depth: 88 centimeters
Bedrock Hardness: weakly cemented
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Top Depth (cm)	Bottom Depth (cm)	Restriction Kind	Restriction Hardness
88	200	bedrock, paralithic	Weakly cemented

Cont. Site ID: S2016ND059011 **Pedon ID:** S2016ND059011

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
8.0	570.0	45	6.0			394	128	well		

A--0 to 18 centimeters (0.0 to 7.1 inches); dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2), moist; 10 percent sand; 68 percent silt; 22 percent clay; weak fine subangular blocky parts to moderate medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 22.0 Percent Clay; 10.0 Percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 7.0, pH meter; clear wavy boundary.

Bt--18 to 51 centimeters (7.1 to 20.1 inches); brown (10YR 5/3) silty clay loam, brown (10YR 4/3), moist; 10 percent sand; 60 percent silt; 30 percent clay; moderate medium prismatic parts to moderate medium subangular blocky structure; slightly hard, friable, moderately sticky, moderately plastic; common very fine roots throughout; common very fine tubular pores; 80 percent prominent 10YR 2/1), moist, clay films on all faces of peds; 30.0 Percent Clay; 10.0 Percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 7.3, pH meter; clear wavy boundary.

Btk--51 to 88 centimeters (20.1 to 34.6 inches); grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2), moist; 10 percent sand; 61 percent silt; 29 percent clay; moderate medium prismatic parts to moderate medium subangular blocky structure; slightly hard, friable, moderately sticky, moderately plastic; common very fine roots throughout; common very fine tubular pores; 60 percent prominent 10YR 2/1), moist, clay films on all faces of peds; 2 percent medium prominent irregular 7.5YR 5/8), moist, masses of oxidized iron Throughout and 3 percent fine prominent irregular 7.5YR 5/8), moist, masses of oxidized iron Throughout; carbonate, finely disseminated and 5 percent fine irregular weakly cemented carbonate masses throughout and 5 percent medium irregular weakly cemented carbonate masses throughout; 29.0 Percent Clay; 10.0 Percent Sand; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.0, pH meter; clear wavy boundary. The redoximorphic features present in this Btk horizon were near the bottom of the horizon just above the sedimentary beds (Cr horizon).

Cr--88 to 200 centimeters (34.6 to 78.7 inches); weakly cemented Shale and siltstone bedrock; structureless massive; .

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018

Description Date: May 5 2016

Describer: Perry Sullivan;Jeanne Heilig;John Kempenich;Elizabeth Burdolski;Kyle Thomson;Brianna Wegner

NEON Plot ID: NOGP_014

Site ID: S2016ND059013

Pedon ID: S2016ND059013

Site Note:

Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.

Lab Source ID:

Lab Pedon #:

Soil Name as Described/Sampled:

Classification:

Soil Name as Correlated: Schaller

Classification: Sandy, mixed, frigid Entic Haplustolls

Pedon Type: undefined observation

Pedon Purpose: research site

Taxon Kind: series

Associated Soils: Manning, Wabek

Physiographic Division: Interior Plains

Physiographic Province: Great Plains Province

Physiographic Section: Missouri plateau, glaciated

State Physiographic Area:

Local Physiographic Area:

Geomorphic Setting: on riser of terrace on plains

Upslope Shape: convex

Cross Slope Shape: convex

Particle Size Control Section: 25 to 100 cm.

Description origin: NASIS

Diagnostic Features: mollic epipedon 0 to 32 cm.

Country:

State: North Dakota

County: Morton

MLRA: 54 -- Rolling Soft Shale Plain

Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota

Map Unit:

Pit Location:

Quad Name:

Std Latitude: 46.8075050

Std Longitude: -100.9035580

Latitude:

Longitude:

Datum: WGS84

UTM Zone: 14

UTM Easting: 354764 meters

UTM Northing: 5185533 meters

Primary Earth Cover: Grass/herbaceous cover

Secondary Earth Cover: Grassland rangeland

Existing Vegetation:

Parent Material: gravelly alluvium

Bedrock Kind:

Bedrock Depth:

Bedrock Hardness:

Bedrock Fracture Interval:

Surface Fragments: 1.0 percent nonflat subrounded indurated 2- to 5-millimeter Mixed rock fragments

Description database: MLRA10_StPaul

Cont. Site ID: S2016ND059013 **Pedon ID:** S2016ND059013

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
19.0	524.0	225	6.0			394	128	excessively		

A--0 to 18 centimeters (0.0 to 7.1 inches); dark grayish brown (10YR 4/2) loamy sand, very dark grayish brown (10YR 3/2), moist; 75 percent sand; 20 percent silt; 5 percent clay; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine roots throughout and common fine roots throughout; many very fine tubular and common fine tubular pores; 3 percent nonflat subrounded indurated 5 to 20-millimeter Mixed rock fragments and 5 percent nonflat subrounded indurated 2 to 5-millimeter Mixed rock fragments; 5.0 Percent Clay; 75.0 Percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter; clear wavy boundary.

AC--18 to 32 centimeters (7.1 to 12.6 inches); dark grayish brown (10YR 4/2) loamy sand, very dark grayish brown (10YR 3/2), moist; 75 percent sand; 20 percent silt; 5 percent clay; weak fine granular structure; loose, loose, nonsticky, nonplastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 4 percent nonflat subrounded indurated 5 to 20-millimeter Mixed rock fragments and 8 percent nonflat subrounded indurated 2 to 5-millimeter Mixed rock fragments; 5.0 Percent Clay; 75.0 Percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter; abrupt wavy boundary.

C1--32 to 46 centimeters (12.6 to 18.1 inches); yellowish brown (10YR 5/6) very gravelly sand, dark yellowish brown (10YR 4/6), moist; 88 percent sand; 9 percent silt; 3 percent clay; structureless single grain; loose, loose, nonsticky, nonplastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 15 percent fine irregular weakly cemented carbonate masses on bottom of rock fragments; 1 percent nonflat subrounded indurated 20 to 76-millimeter Mixed rock fragments and 9 percent nonflat subrounded indurated 5 to 20-millimeter Mixed rock fragments and 30 percent nonflat subrounded indurated 2 to 5-millimeter Mixed rock fragments; 3.0 Percent Clay; 88.0 Percent Sand; strong effervescence, by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter; abrupt wavy boundary. The soil matrix of the C1 horizon is non-effervescent but the carbonate masses coating the bottoms of the rock fragments in this horizon exhibited strong effervescence.

C2--46 to 130 centimeters (18.1 to 51.2 inches); light yellowish brown (2.5Y 6/3) fine sand, olive brown (2.5Y 4/3), moist; 90 percent sand; 8 percent silt; 2 percent clay; structureless single grain; loose, loose, nonsticky, nonplastic; common very fine roots throughout; common very fine tubular pores; carbonate, finely disseminated throughout; 2.0 Percent Clay; 10.0 Percent Sand; slight effervescence, by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter; clear wavy boundary.

Ab--130 to 140 centimeters (51.2 to 55.1 inches); olive brown (2.5Y 4/3) loamy sand, dark olive brown (2.5Y 3/3), moist; 80 percent sand; 12 percent silt; 8 percent clay; structureless single grain; loose, loose, nonsticky, nonplastic; carbonate, finely disseminated throughout; 4 percent nonflat subrounded indurated 2 to 5-millimeter Mixed rock fragments; 8.0 Percent Clay; 80.0 Percent Sand; slight effervescence, by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter; clear wavy boundary.

C3--140 to 200 centimeters (55.1 to 78.7 inches); light olive brown (2.5Y 5/3) gravelly sand, dark olive brown (2.5Y 3/3), moist; 90 percent sand; 8 percent silt; 2 percent clay; structureless single grain; loose, loose, nonsticky, nonplastic; carbonate, finely disseminated throughout; 10 percent nonflat subrounded indurated 2 to 5-millimeter Mixed rock fragments and 10 percent nonflat subrounded indurated 5 to 20-millimeter Mixed rock fragments; 2.0 Percent Clay; 90.0 Percent Sand; slight effervescence, by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter. Lots of coarse sand present in this horizon.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 3 2016
Describer: John Kempenich;Kyle Thomson;Elizabeth Burdolski
NEON Plot ID: NOGP_015
Site ID: S2016ND059014

Pedon ID: S2016ND059014
Site Note:
Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.
Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Savage
Classification: Fine, smectitic, frigid Vertic Argiustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on backslope of side slope of hillslope on plains
Upslope Shape: linear
Cross Slope Shape: linear
Particle Size Control Section: 27 to 77 cm.
Description origin: NASIS
Diagnostic Features: mollic epipedon 0 to 44 cm.
argillic horizon 27 to 85 cm.
secondary carbonates 85 to 104 cm.
lithologic discontinuity 104 to 200 cm.
paralithic contact 114 to 200 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:
Pit Location:
Quad Name:
Std Latitude: 46.7857320
Std Longitude: -100.9120450
Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 354057 meters
UTM Northing: 5183129 meters
Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Grassland rangeland
Existing Vegetation:
Parent Material: alluvium over residuum weathered from mudstone
Bedrock Kind: Mudstone
Bedrock Depth: 114 centimeters
Bedrock Hardness: extremely weakly cemented
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Top Depth (cm)	Bottom Depth (cm)	Restriction Kind	Restriction Hardness
114	200	bedrock, paralithic	Extremely weakly cemented

Cont. Site ID: S2016ND059014 **Pedon ID:** S2016ND059014

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
12.0	546.0	135	6.0			394	128	well		

A--0 to 27 centimeters (0.0 to 10.6 inches); dark grayish brown (10YR 4/2) clay loam, very dark brown (10YR 2/2), moist; 22 percent sand; 46 percent silt; 32 percent clay; strong medium granular structure; moderately hard, firm, moderately sticky, moderately plastic; many very fine roots throughout and common medium roots throughout and common fine roots throughout and common coarse roots throughout; many very fine tubular and common fine tubular pores; 32.0 Percent Clay; 22.0 Percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 6.8, pH meter; clear wavy boundary.

Bt1--27 to 44 centimeters (10.6 to 17.3 inches); grayish brown (2.5Y 5/2) clay loam, very dark grayish brown (2.5Y 3/2), moist; 23 percent sand; 41 percent silt; 36 percent clay; moderate coarse prismatic parts to moderate medium angular blocky structure; moderately hard, firm, moderately sticky, moderately plastic; common very fine roots between peds and common fine roots throughout; common very fine tubular and common fine tubular pores; 70 percent prominent 2.5Y 3/1), moist, clay films on all faces of peds; 36.0 Percent Clay; 23.0 Percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 7.2, pH meter; gradual wavy boundary.

Bt2--44 to 73 centimeters (17.3 to 28.7 inches); light olive brown (2.5Y 5/3) clay loam, olive brown (2.5Y 4/3), moist; 25 percent sand; 37 percent silt; 38 percent clay; moderate coarse prismatic parts to moderate medium angular blocky structure; hard, very firm, moderately sticky, moderately plastic; common very fine roots between peds and common fine roots throughout; common very fine tubular and common fine tubular pores; 85 percent prominent 2.5Y 3/2), moist, clay films on all faces of peds; 1 percent nonflat subrounded indurated 5 to 20-millimeter Granite fragments; 38.0 Percent Clay; 25.0 Percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter; gradual wavy boundary.

Bt3--73 to 85 centimeters (28.7 to 33.5 inches); light olive brown (2.5Y 5/4) clay loam, olive brown (2.5Y 4/4), moist; 30 percent sand; 36 percent silt; 34 percent clay; moderate coarse prismatic parts to moderate medium angular blocky structure; hard, very firm, moderately sticky, moderately plastic; common very fine roots between peds; common very fine tubular pores; 60 percent distinct 2.5Y 3/3), moist, clay films on all faces of peds; 8 percent coarse prominent irregular 10YR 5/6), moist, and 7.5YR 4/4), moist, masses of oxidized iron On faces of peds; 1 percent nonflat subrounded indurated 5 to 20-millimeter Granite fragments; 34.0 Percent Clay; 30.0 Percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter; clear wavy boundary.

Bk--85 to 104 centimeters (33.5 to 40.9 inches); light yellowish brown (2.5Y 6/3) clay loam, light olive brown (2.5Y 5/3), moist; 40 percent sand; 29 percent silt; 31 percent clay; moderate coarse prismatic parts to weak medium subangular blocky structure; hard, very firm, moderately sticky, moderately plastic; common very fine roots between peds; common very fine tubular pores; 10 percent distinct 2.5Y 4/3), moist, clay films on vertical faces of peds; 2 percent coarse prominent irregular 10YR 5/6), moist, masses of oxidized iron On faces of peds; 25 percent coarse irregular weakly cemented carbonate masses on horizontal faces of peds; 1 percent nonflat subrounded indurated 5 to 20-millimeter Granite fragments; 31.0 Percent Clay; 40.0 Percent Sand; strong effervescence, by HCl, 1 normal; slightly alkaline, pH 7.7, pH meter.

2C--104 to 114 centimeters (40.9 to 44.9 inches); loam; 50 percent sand; 30 percent silt; 20 percent clay; massive; slightly hard, friable, slightly sticky, slightly plastic; 20.0 Percent Clay; 50.0 Percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter.

2Cr--114 to 200 centimeters (44.9 to 78.7 inches); extremely weakly cemented Mudstone bedrock; noneffervescent, by HCl, 1 normal.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 4 2016
Describer: John Kempenich;Elizabeth Burdolski;Kyle Thomson
NEON Plot ID: NOGP_017
Site ID: S2016ND059016

Pedon ID: S2016ND059016
Site Note:
Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.
Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Sen
Classification: Fine-silty, mixed, superactive, frigid Typic Haplustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on backslope of side slope of hillslope on plains
Upslope Shape: linear
Cross Slope Shape: linear
Particle Size Control Section: 25 to 67 cm.
Description origin: NASIS
Diagnostic Features: mollic epipedon 0 to 22 cm.
cambic horizon 22 to 36 cm.
secondary carbonates 36 to 67 cm.
paralithic contact 67 to 200 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:
Pit Location:
Quad Name:
Std Latitude: 46.7918500
Std Longitude: -100.9170780
Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 353690 meters
UTM Northing: 5183818 meters
Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Grassland rangeland
Existing Vegetation:
Parent Material: fine-silty residuum weathered from siltstone
Bedrock Kind: Siltstone
Bedrock Depth: 67 centimeters
Bedrock Hardness: very weakly cemented
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Top Depth (cm)	Bottom Depth (cm)	Restriction Kind	Restriction Hardness
67	200	bedrock, paralithic	Very weakly cemented

Cont. Site ID: S2016ND059016 **Pedon ID:** S2016ND059016

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
28.0	564.0	0	6.0			394	128	well		

A--0 to 22 centimeters (0.0 to 8.7 inches); dark gray (10YR 4/1) silty clay loam, very dark gray (10YR 3/1), moist; 10 percent sand; 62 percent silt; 28 percent clay; strong medium granular structure; moderately hard, firm, moderately sticky, moderately plastic; common very fine roots throughout and common fine roots throughout and common coarse roots throughout; common very fine tubular and common fine tubular and common coarse tubular pores; noneffervescent, by HCl, 1 normal; neutral, pH 7.3, pH meter; clear wavy boundary.

Bw--22 to 36 centimeters (8.7 to 14.2 inches); grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2), moist; 10 percent sand; 57 percent silt; 33 percent clay; weak medium prismatic parts to weak medium subangular blocky structure; moderately hard, firm, moderately sticky, moderately plastic; common very fine roots throughout and common fine roots throughout and common coarse roots throughout; common very fine tubular and common fine tubular and common coarse tubular pores; 10 percent faint 2.5Y 3/2), moist, clay films on vertical faces of peds; noneffervescent, by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter; clear wavy boundary.

Bk--36 to 67 centimeters (14.2 to 26.4 inches); light yellowish brown (2.5Y 6/3) silty clay loam, light olive brown (2.5Y 5/3), moist; 10 percent sand; 55 percent silt; 35 percent clay; weak medium prismatic parts to weak medium subangular blocky structure; moderately hard, firm, moderately sticky, moderately plastic; common very fine roots throughout; common very fine tubular pores; 4 percent medium distinct irregular weakly cemented 10YR 5/6), moist, masses of oxidized iron Throughout; 3 percent coarse irregular weakly cemented carbonate masses throughout; strong effervescence, by HCl, 1 normal; moderately alkaline, pH 8.3, pH meter; clear wavy boundary.

Cr--67 to 200 centimeters (26.4 to 78.7 inches); light brownish gray (2.5Y 6/2) very weakly cemented Siltstone bedrock, dark grayish brown (2.5Y 4/2), moist; 10 percent sand; 55 percent silt; 35 percent clay; 8 percent medium prominent irregular weakly cemented 10YR 5/6), moist, masses of oxidized iron Along lamina or strata surfaces; 2 percent medium irregular weakly cemented carbonate masses throughout; strong effervescence, by HCl, 1 normal.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 2 2016
Describer: John Kempenich;Jeanne Heilig;Perry Sullivan;Kyle Thomson
NEON Plot ID: NOGP_018
Site ID: S2016ND059017

Pedon ID: S2016ND059017

Site Note: The perennial grasses on this site were all introduced species. This site is an old nearly level river terrace and appears to have either been farmed for a brief period of time many years ago or possibly was used for hay before the current land use as pasture.

Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.

Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Wilton
Classification: Fine-silty, mixed, superactive, frigid Pachic Haplustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils: Temvik
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on tread of terrace on plains
Upslope Shape: concave
Cross Slope Shape: linear
Particle Size Control Section: 25 to 100 cm.
Description origin: NASIS

Diagnostic Features: mollic epipedon 0 to 49 cm.
lithologic discontinuity 56 to 90 cm.
calcic horizon 56 to 90 cm.
secondary carbonates 90 to 200 cm.
lithologic discontinuity 90 to 200 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:

Pit Location:

Quad Name:

Std Latitude: 46.7648070
Std Longitude: -100.9216020

Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 353271 meters
UTM Northing: 5180822 meters

Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Tame pastureland
Existing Vegetation:
Parent Material: silty loess over till
Bedrock Kind:
Bedrock Depth:
Bedrock Hardness:
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Cont. Site ID: S2016ND059017 **Pedon ID:** S2016ND059017

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
4.0	591.0	150	6.0			394	128	well		

A--0 to 30 centimeters (0.0 to 11.8 inches); very dark grayish brown (10YR 3/2) silt loam, very dark brown (10YR 2/2), moist; 10 percent sand; 68 percent silt; 22 percent clay; moderate medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots throughout; many very fine tubular pores; noneffervescent, by HCl, 1 normal; clear wavy boundary.

Bw1--30 to 49 centimeters (11.8 to 19.3 inches); brown (10YR 4/3) silt loam, dark brown (10YR 3/3), moist; 10 percent sand; 65 percent silt; 25 percent clay; moderate medium prismatic parts to moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; noneffervescent, by HCl, 1 normal; clear wavy boundary.

Bw2--49 to 56 centimeters (19.3 to 22.0 inches); brown (10YR 5/3) silty clay loam, brown (10YR 4/3), moist; 18 percent sand; 54 percent silt; 28 percent clay; weak medium prismatic parts to weak medium subangular blocky structure; moderately hard, firm, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; 2 percent nonflat subangular indurated 5 to 20-millimeter Mixed rock fragments; noneffervescent, by HCl, 1 normal; clear wavy boundary.

2Bk1--56 to 90 centimeters (22.0 to 35.4 inches); grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2), moist; 35 percent sand; 37 percent silt; 28 percent clay; weak medium prismatic parts to weak medium subangular blocky structure; moderately hard, firm, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; 5 percent carbonate coats on bottom of rock fragments; 1 percent medium prominent irregular 7.5YR 5/8), moist, masses of oxidized iron In matrix and 2 percent medium distinct irregular 2.5YR 4/6), moist, masses of oxidized iron In matrix; carbonate, finely disseminated throughout and 5 percent coarse irregular weakly cemented carbonate masses throughout and 5 percent medium irregular weakly cemented carbonate masses throughout; 10 percent nonflat subangular indurated 5 to 20-millimeter Granite fragments; strong effervescence, by HCl, 1 normal; clear wavy boundary.

3Bk2--90 to 133 centimeters (35.4 to 52.4 inches); brown (10YR 5/3) clay loam, brown (10YR 4/3), moist; 25 percent sand; 43 percent silt; 32 percent clay; weak medium subangular blocky structure; moderately hard, firm, slightly sticky, slightly plastic; 2 percent medium distinct irregular 2.5YR 4/6), moist, masses of oxidized iron In matrix and 5 percent coarse prominent irregular 7.5YR 5/8), moist, masses of oxidized iron In matrix; carbonate, finely disseminated throughout and 5 percent coarse irregular weakly cemented carbonate masses throughout and 5 percent medium irregular weakly cemented carbonate masses throughout; 1 percent nonflat subangular indurated 2 to 5-millimeter Granite fragments and 1 percent nonflat subangular indurated 5 to 20-millimeter Granite fragments; strong effervescence, by HCl, 1 normal; clear wavy boundary.

3C--133 to 200 centimeters (52.4 to 78.7 inches); yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4), moist; 30 percent sand; 40 percent silt; 30 percent clay; massive; slightly hard, friable, slightly sticky, slightly plastic; 3 percent medium distinct irregular 2.5YR 4/6), moist, masses of oxidized iron In matrix and 15 percent coarse prominent irregular 7.5YR 5/8), moist, masses of oxidized iron In matrix; carbonate, finely disseminated throughout and 5 percent coarse irregular weakly cemented carbonate masses lining pores and 5 percent medium irregular weakly cemented carbonate masses lining pores; 1 percent nonflat subangular indurated 2 to 5-millimeter Granite fragments and 1 percent nonflat subangular indurated 5 to 20-millimeter Granite fragments; slight effervescence, by HCl, 1 normal.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 9 2016
Describer: Jeanne Heilig;Perry Sullivan;Kyle Thomson
NEON Plot ID: NOGP_021
Site ID: S2016ND059020

Pedon ID: S2016ND059020
Site Note:
Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.
Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Chama
Classification: Fine-silty, mixed, superactive, frigid Typic Calciustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on summit of crest of ridge on plains
Upslope Shape: convex
Cross Slope Shape: linear
Particle Size Control Section: 25 to 68 cm.
Description origin: NASIS
Diagnostic Features: mollic epipedon 0 to 14 cm.
calcic horizon 14 to 68 cm.
paralithic contact 68 to 200 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:
Pit Location:
Quad Name:
Std Latitude: 46.8005050
Std Longitude: -100.9195980
Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 353521 meters
UTM Northing: 5184784 meters
Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Grassland rangeland
Existing Vegetation:
Parent Material: silty residuum weathered from calcareous siltstone
Bedrock Kind: Calcareous siltstone
Bedrock Depth: 68 centimeters
Bedrock Hardness: very weakly cemented
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Top Depth (cm)	Bottom Depth (cm)	Restriction Kind	Restriction Hardness
68	200	bedrock, paralithic	Very weakly cemented

Cont. Site ID: S2016ND059020 **Pedon ID:** S2016ND059020

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
2.0	564.0	285	6.0			394	128	well		

A--0 to 14 centimeters (0.0 to 5.5 inches); brown (10YR 4/3) silty clay loam, dark brown (10YR 3/3), moist; 4 percent sand; 64 percent silt; 32 percent clay; moderate medium granular structure; moderately hard, friable, moderately sticky, moderately plastic; many very fine roots throughout and many fine roots throughout; common very fine tubular and common fine tubular pores; carbonate, finely disseminated throughout; 32.0 percent Clay; 4.0 percent Sand; slight effervescence, by HCl, 1 normal; neutral, pH 7.2, pH meter; clear wavy boundary.

Bk--14 to 54 centimeters (5.5 to 21.3 inches); brown (10YR 5/3) silty clay loam, brown (10YR 4/3), moist; 4 percent sand; 66 percent silt; 30 percent clay; moderate coarse prismatic parts to moderate medium subangular blocky structure; moderately hard, friable, moderately sticky, moderately plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; carbonate, finely disseminated throughout; 30.0 Percent Clay; 4.0 Percent Sand; strong effervescence, by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter; clear wavy boundary.

BCk--54 to 68 centimeters (21.3 to 26.8 inches); grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2), moist; 4 percent sand; 67 percent silt; 29 percent clay; moderate medium subangular blocky structure; moderately hard, friable, moderately sticky, moderately plastic; common very fine roots throughout; common very fine tubular pores; 10 percent fine prominent irregular 2.5Y 5/6), moist, masses of oxidized iron Throughout; carbonate, finely disseminated throughout and 10 percent fine irregular weakly cemented carbonate masses throughout and 10 percent medium irregular weakly cemented carbonate masses throughout; 4.0 Percent Sand; 29.0 percent Clay; strong effervescence, by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter; clear wavy boundary. Redoximorphic features have formed in a thin band right above the sedimentary beds of the Cr horizon due to lateral flow of subsurface water along the top of the beds.

Cr--68 to 200 centimeters (26.8 to 78.7 inches); very weakly cemented Calcareous siltstone bedrock; .

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 5 2016
Describer: John Kempenich;Kyle Thomson;Elizabeth Burdolski
NEON Plot ID: NOGP_022
Site ID: S2016ND059021

Pedon ID: S2016ND059021

Site Note: The perennial grasses on this site were all introduced species and the stand was inter-mixed with alfalfa. This site was in cropland at one time but was seeded back to permanent vegetation years ago and is now used as pasture for grazing. This pedon was sampled on the foot slope near the base of the ridge. This site included several hillslope landform positions within the plot area - sideslope and footslope and toeslope and swale.

Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.

Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Farnuf
Classification: Fine-loamy, mixed, superactive, frigid Typic Argiustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on footslope of base slope of hillslope on plains
Upslope Shape: concave
Cross Slope Shape: linear
Particle Size Control Section: 25 to 57 cm.
Description origin: NASIS

Diagnostic Features: mollic epipedon 0 to 25 cm.
argillic horizon 25 to 57 cm.
secondary carbonates 37 to 130 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:

Pit Location:

Quad Name:

Std Latitude: 46.7983250
Std Longitude: -100.9042680

Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 354685 meters
UTM Northing: 5184514 meters

Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Tame pastureland
Existing Vegetation:
Parent Material: loamy alluvium derived from mudstone
Bedrock Kind: Mudstone
Bedrock Depth:
Bedrock Hardness: very weakly cemented
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Cont. Site ID: S2016ND059021 **Pedon ID:** S2016ND059021

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
8.0	546.0	225	6.0			394	128	well		

Ap--0 to 13 centimeters (0.0 to 5.1 inches); dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2), moist; 35 percent sand; 45 percent silt; 20 percent clay; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots throughout and common fine roots throughout and common coarse roots throughout; many very fine tubular and common fine tubular and common coarse tubular pores; 20.0 percent Clay; 35.0 percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 7.1, pH meter; abrupt smooth boundary. Weak platy structure evident near the bottom of the Ap horizon resulting from soil compaction caused by cultivation in the past.

A--13 to 25 centimeters (5.1 to 9.8 inches); dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2), moist; 35 percent sand; 42 percent silt; 23 percent clay; moderate medium subangular blocky parts to moderate medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots throughout and common fine roots throughout and common coarse roots throughout; many very fine tubular and common fine tubular and common coarse tubular pores; 23.0 percent Clay; 35.0 percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter; clear wavy boundary.

Bt--25 to 37 centimeters (9.8 to 14.6 inches); grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2), moist; 30 percent sand; 40 percent silt; 30 percent clay; moderate medium prismatic parts to moderate medium subangular blocky structure; moderately hard, firm, moderately sticky, moderately plastic; common very fine roots throughout; common very fine tubular pores; 25 percent distinct 2.5Y 3/2), moist, clay films on all faces of peds; 30.0 percent Clay; 30.0 percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter; clear wavy boundary.

Btk--37 to 57 centimeters (14.6 to 22.4 inches); light yellowish brown (2.5Y 6/3) clay loam, olive brown (2.5Y 4/3), moist; 25 percent sand; 46 percent silt; 29 percent clay; moderate medium prismatic parts to moderate medium subangular blocky structure; moderately hard, firm, moderately sticky, moderately plastic; common very fine roots throughout; common very fine tubular pores; 25 percent distinct 2.5Y 3/2), moist, clay films on all faces of peds; carbonate, finely disseminated throughout and 3 percent medium irregular weakly cemented carbonate masses throughout; 29.0 percent Clay; 25.0 percent Sand; strong effervescence, by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter; gradual wavy boundary.

Bk--57 to 105 centimeters (22.4 to 41.3 inches); light yellowish brown (2.5Y 6/4) clay loam, olive brown (2.5Y 4/4), moist; 25 percent sand; 46 percent silt; 29 percent clay; weak coarse prismatic parts to moderate coarse subangular blocky structure; moderately hard, firm, moderately sticky, moderately plastic; common very fine roots throughout; common very fine tubular pores; carbonate, finely disseminated throughout and 8 percent coarse irregular weakly cemented carbonate masses throughout; 29.0 percent Clay; 25.0 percent Sand; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.4, pH meter; gradual wavy boundary.

BCk--105 to 130 centimeters (41.3 to 51.2 inches); light yellowish brown (2.5Y 6/4) clay loam, olive brown (2.5Y 4/4), moist; 40 percent sand; 32 percent silt; 28 percent clay; weak coarse subangular blocky structure; moderately hard, firm, moderately sticky, moderately plastic; common very fine roots throughout; common very fine tubular pores; carbonate, finely disseminated throughout and 4 percent coarse irregular weakly cemented carbonate masses throughout; 28.0 percent Clay; 40.0 percent Sand; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.4, pH meter; gradual wavy boundary.

C--130 to 200 centimeters (51.2 to 78.7 inches); light yellowish brown (2.5Y 6/3) loam, olive brown (2.5Y 4/3), moist; 40 percent sand; 35 percent silt; 25 percent clay; massive; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; 3 percent medium irregular weakly cemented carbonate masses throughout; 25.0 Percent Clay; 40.0 Percent Sand; strong effervescence, by HCl, 1 normal; moderately alkaline, pH 8.3, pH meter. Percentage of sand increases with depth in the C horizon.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 4 2016
Describer: John Kempenich;Elizabeth Burdolski;Kyle Thomson
NEON Plot ID: NOGP_023
Site ID: S2016ND059022

Pedon ID: S2016ND059022
Site Note:
Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.
Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Cabba
Classification: Loamy, mixed, superactive, calcareous, frigid Typic Ustorthents
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on shoulder of nose slope of hillslope on plains
Upslope Shape: convex
Cross Slope Shape: convex
Particle Size Control Section: 25 to 40 cm.
Description origin: NASIS
Diagnostic Features: ochric epipedon 0 to 12 cm.
secondary carbonates 12 to 40 cm.
paralithic contact 40 to 200 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:
Pit Location:
Quad Name:
Std Latitude: 46.7865050
Std Longitude: -100.9105930
Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 354170 meters
UTM Northing: 5183212 meters
Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Grassland rangeland
Existing Vegetation:
Parent Material: loamy residuum weathered from mudstone
Bedrock Kind: Mudstone
Bedrock Depth: 40 centimeters
Bedrock Hardness: very weakly cemented
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Top Depth (cm)	Bottom Depth (cm)	Restriction Kind	Restriction Hardness
40	200	bedrock, paralithic	Very weakly cemented

Cont. Site ID: S2016ND059022 **Pedon ID:** S2016ND059022

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
11.0	546.0	140	6.0			394	128	well		

A--0 to 12 centimeters (0.0 to 4.7 inches); very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2), dry; 30 percent sand; 47 percent silt; 23 percent clay; weak medium subangular blocky parts to moderate medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 1 percent nonflat subrounded indurated 5 to 20-millimeter Granite fragments; noneffervescent, by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter; clear wavy boundary.

Bk--12 to 28 centimeters (4.7 to 11.0 inches); brown (10YR 4/3) loam, pale brown (10YR 6/3), dry; 28 percent sand; 49 percent silt; 23 percent clay; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; carbonate, finely disseminated throughout and 1 percent medium irregular weakly cemented carbonate masses throughout; strong effervescence, by HCl, 1 normal; moderately alkaline, pH 8.3, pH meter; clear wavy boundary.

BCk--28 to 40 centimeters (11.0 to 15.7 inches); olive brown (2.5Y 4/3) loam, light yellowish brown (2.5Y 6/3), dry; 30 percent sand; 47 percent silt; 23 percent clay; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular and common fine tubular pores; 2 percent medium distinct irregular 10YR 4/6), moist, masses of oxidized iron On horizontal faces of peds and 3 percent fine distinct irregular 10YR 5/6), moist, masses of oxidized iron Lining pores; carbonate, finely disseminated throughout and 2 percent medium irregular weakly cemented carbonate masses throughout; strong effervescence, by HCl, 1 normal; moderately alkaline, pH 8.4, pH meter; clear wavy boundary.

Cr--40 to 200 centimeters (15.7 to 78.7 inches); light olive brown (2.5Y 5/4) very weakly cemented Mudstone bedrock, light yellowish brown (2.5Y 6/3), dry; structureless massive; common very fine roots top of horizon; 3 percent coarse distinct irregular 7.5YR 5/6), moist, masses of oxidized iron On horizontal faces of peds; 3 percent coarse irregular weakly cemented carbonate masses along lamina or strata surfaces; strong effervescence, by HCl, 1 normal.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 4 2016
Describer: Perry Sullivan;Jeanne Heilig;Brianna Wegner
NEON Plot ID: NOGP_024
Site ID: S2016ND059023

Pedon ID: S2016ND059023

Site Note: The perennial grasses on this site were all introduced species and this pedon had an Ap surface horizon indicating that this site was in cropland at one time but was seeded back to permanent vegetation years ago and is now used as pasture for grazing.

Pedon Note: This Janesburg pedon was capped with 50 cm of silty loess and is not representative of the Janesburg series in MLRA 54. This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.

Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Janesburg
Classification: Fine, smectitic, frigid Typic Natrustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:

Local Physiographic Area:
Geomorphic Setting: on backslope of side slope of ridge on plains
Upslope Shape: concave
Cross Slope Shape: linear
Particle Size Control Section: 50 to 75 cm.
Description origin: NASIS

Diagnostic Features: mollic epipedon 0 to 21 cm.
cambic horizon 21 to 50 cm.
secondary carbonates 50 to 99 cm.
natric horizon 50 to 75 cm.
lithologic discontinuity 50 to 200 cm.
paralithic contact 99 to 200 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:

Pit Location:

Quad Name:

Std Latitude: 46.7991350
Std Longitude: -100.9027530

Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 354803 meters
UTM Northing: 5184601 meters

Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Tame pastureland
Existing Vegetation:
Parent Material: silty loess over clayey residuum weathered from calcareous shale
Bedrock Kind: Calcareous shale
Bedrock Depth: 99 centimeters
Bedrock Hardness: weakly cemented
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Top Depth (cm)	Bottom Depth (cm)	Restriction Kind	Restriction Hardness
50	75	natric	Noncemented
99	200	bedrock, paralithic	Weakly cemented

Cont. Site ID: S2016ND059023 **Pedon ID:** S2016ND059023

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
7.0	555.0	315	6.0			394	128	well		

Ap--0 to 13 centimeters (0.0 to 5.1 inches); very dark grayish brown (10YR 3/2) silt loam, black (10YR 2/1), moist; 5 percent sand; 75 percent silt; 20 percent clay; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots throughout and common fine roots throughout; many very fine tubular and common fine tubular pores; 20.0 percent Clay; 5.0 percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 7.2, pH meter; abrupt smooth boundary.

Bw1--13 to 21 centimeters (5.1 to 8.3 inches); very dark grayish brown (10YR 3/2) silt loam, very dark brown (10YR 2/2), moist; 5 percent sand; 72 percent silt; 23 percent clay; weak medium prismatic parts to moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 23.0 Percent Clay; 5.0 Percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter; clear smooth boundary.

Bw2--21 to 50 centimeters (8.3 to 19.7 inches); grayish brown (10YR 5/2) silt loam, dark grayish brown (10YR 4/2), moist; 5 percent sand; 70 percent silt; 25 percent clay; moderate coarse prismatic parts to moderate medium subangular blocky structure; moderately hard, firm, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; 40 percent prominent 10YR 2/1), moist, clay films on all faces of peds; 5.0 percent Sand; 25.0 percent Clay; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter; clear wavy boundary.

2Btnk--50 to 75 centimeters (19.7 to 29.5 inches); dark grayish brown (10YR 4/2) silty clay, very dark grayish brown (10YR 3/2), moist; 8 percent sand; 47 percent silt; 45 percent clay; strong medium columnar parts to strong medium angular blocky structure; moderately hard, firm, very sticky, very plastic; common very fine roots between peds; common very fine tubular pores; 10 percent distinct 10YR 5/1), moist, silt coats on tops of soil columns and 75 percent distinct 10YR 2/1), moist, clay films on all faces of peds; carbonate, finely disseminated throughout and 3 percent fine irregular weakly cemented carbonate masses throughout and 3 percent medium irregular weakly cemented carbonate masses throughout; 8.0 Percent Clay; 45.0 Percent Sand; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter; gradual wavy boundary.

2Bk--75 to 87 centimeters (29.5 to 34.3 inches); light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/2), moist; 8 percent sand; 62 percent silt; 30 percent clay; moderate medium prismatic parts to moderate medium angular blocky structure; moderately hard, firm, very sticky, very plastic; common very fine roots throughout; common very fine tubular pores; 1 percent fine distinct irregular 10YR 4/6), moist, masses of oxidized iron Throughout and 5 percent medium distinct irregular 10YR 6/6), moist, masses of oxidized iron Throughout; carbonate, finely disseminated throughout and 20 percent medium irregular weakly cemented carbonate masses throughout; 30.0 Percent Clay; 8.0 Percent Sand; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.4, pH meter; gradual wavy boundary.

2BCky--87 to 99 centimeters (34.3 to 39.0 inches); light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/2), moist; 8 percent sand; 59 percent silt; 33 percent clay; weak coarse angular blocky parts to moderate medium angular blocky structure; moderately hard, firm, very sticky, very plastic; common very fine roots throughout; common very fine tubular pores; 1 percent medium prominent irregular 10YR 6/6), moist, masses of oxidized iron Throughout; 15 percent fine gypsum crystals, unspecified between peds and 18 percent medium irregular weakly cemented carbonate masses between peds; 33.0 Percent Clay; 8.0 Percent Sand; violent effervescence, by HCl, 1 normal; strongly alkaline, pH 8.6, pH meter; clear wavy boundary.

2Cr--99 to 200 centimeters (39.0 to 78.7 inches); weakly cemented Calcareous shale bedrock; structureless massive; noneffervescent, by HCl, 1 normal; moderately alkaline, pH 8.3, pH meter.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 2 2016
Describer: Jeanne Heilig;John Kempenich
NEON Plot ID: NOGP_025
Site ID: S2016ND059024

Pedon ID: S2016ND059024
Site Note: The perennial grasses on this site were all introduced species and the stand was inter-mixed with sweet clover.
Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.
Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Wilton
Classification: Fine-silty, mixed, superactive, frigid Pachic Haplustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils: Temvik
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on tread of terrace on plains
Upslope Shape: linear
Cross Slope Shape: linear
Particle Size Control Section: 25 to 100 cm.
Description origin: NASIS

Diagnostic Features: mollic epipedon 0 to 52 cm.
cambic horizon 52 to 64 cm.
secondary carbonates 64 to 150 cm.
lithologic discontinuity 75 to 200 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:
Pit Location:
Quad Name:
Std Latitude: 46.7661550
Std Longitude: -100.9212900
Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 353298 meters
UTM Northing: 5180971 meters

Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Tame pastureland
Existing Vegetation:
Parent Material: silty loess over till
Bedrock Kind:
Bedrock Depth:
Bedrock Hardness:
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Cont. Site ID: S2016ND059024 **Pedon ID:** S2016ND059024

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
1.0	593.0	135	6.0			394	128	well		

A--0 to 32 centimeters (0.0 to 12.6 inches); very dark grayish brown (10YR 3/2) silt loam, very dark brown (10YR 2/2), moist; 10 percent sand; 68 percent silt; 22 percent clay; moderate medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 1 percent nonflat subrounded indurated 5 to 20-millimeter Granite fragments; noneffervescent, by HCl, 1 normal; neutral, pH 7.2, pH meter; clear wavy boundary.

Bw1--32 to 52 centimeters (12.6 to 20.5 inches); dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2), moist; 12 percent sand; 64 percent silt; 24 percent clay; moderate medium prismatic parts to moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 10 percent faint 10YR 2/2), moist, clay films on all faces of peds; 1 percent nonflat subrounded indurated 5 to 20-millimeter Granite fragments; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter; clear wavy boundary.

Bw2--52 to 64 centimeters (20.5 to 25.2 inches); brown (10YR 5/3) silt loam, brown (10YR 4/3), moist; 12 percent sand; 62 percent silt; 26 percent clay; moderate medium prismatic parts to moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 3 percent faint 10YR 3/2), moist, clay films on all faces of peds; 1 percent nonflat subrounded indurated 5 to 20-millimeter Granite fragments; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter; clear wavy boundary.

Bk1--64 to 75 centimeters (25.2 to 29.5 inches); brown (10YR 5/3) silty clay loam, brown (10YR 4/3), moist; 18 percent sand; 54 percent silt; 28 percent clay; moderate medium prismatic parts to moderate medium subangular blocky structure; moderately hard, firm, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; carbonate, finely disseminated throughout; 1 percent nonflat subrounded indurated 5 to 20-millimeter Granite fragments and 1 percent flat subangular indurated 2 to 150-millimeter Mixed rock fragments; slight effervescence, by HCl, 1 normal; moderately alkaline, pH 7.9, pH meter; clear wavy boundary.

2Bk2--75 to 150 centimeters (29.5 to 59.1 inches); light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2), moist; 22 percent sand; 45 percent silt; 33 percent clay; moderate medium subangular blocky structure; moderately hard, firm, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; carbonate, finely disseminated throughout and 25 percent fine irregular weakly cemented carbonate masses throughout and 10 percent medium irregular weakly cemented carbonate masses throughout; 1 percent nonflat subrounded indurated 2 to 5-millimeter Granite fragments and 1 percent nonflat subrounded indurated 5 to 20-millimeter Granite fragments; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.2, pH meter; clear wavy boundary.

2C--150 to 200 centimeters (59.1 to 78.7 inches); light olive brown (2.5Y 5/3) clay loam, olive brown (2.5Y 4/3), moist; 30 percent sand; 40 percent silt; 30 percent clay; massive; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout; common very fine tubular pores; 1 percent coarse distinct irregular 7.5YR 4/6), moist, masses of oxidized iron In matrix and 10 percent medium distinct irregular 7.5YR 4/6), moist, masses of oxidized iron In matrix; carbonate, finely disseminated throughout and 5 percent fine irregular weakly cemented carbonate masses lining pores; 1 percent nonflat subrounded indurated 2 to 5-millimeter Granite fragments and 1 percent nonflat subrounded indurated 5 to 20-millimeter Granite fragments; slight effervescence, by HCl, 1 normal; moderately alkaline, pH 8.0, pH meter.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 5 2016
Describer: Jeanne Heilig;Perry Sullivan;Brianna Wegner
NEON Plot ID: NOGP_028
Site ID: S2016ND059027

Pedon ID: S2016ND059027

Site Note: The perennial grasses on this site were all introduced species and this pedon had an Ap surface horizon indicating that this site was in cropland at one time but was seeded back to permanent vegetation years ago and is now used as pasture for grazing.

Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.

Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Grail
Classification: Fine, smectitic, frigid Pachic Vertic Argiustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on footslope of base slope of ridge on plains
Upslope Shape: linear
Cross Slope Shape: linear
Particle Size Control Section: 34 to 84 cm.
Description origin: NASIS

Diagnostic Features: mollic epipedon 0 to 85 cm.
argillic horizon 34 to 105 cm.
secondary carbonates 85 to 162 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:

Pit Location:

Quad Name:

Std Latitude: 46.8009600
Std Longitude: -100.9047670

Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 354654 meters
UTM Northing: 5184807 meters

Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Tame pastureland
Existing Vegetation:
Parent Material: alluvium derived from shale
Bedrock Kind:
Bedrock Depth:
Bedrock Hardness:
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Cont. Site ID: S2016ND059027 **Pedon ID:** S2016ND059027

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
7.0	541.0	270	6.0			394	128	well		

Ap--0 to 15 centimeters (0.0 to 5.9 inches); very dark gray (10YR 3/1) loam, black (10YR 2/1), moist; 20 percent sand; 58 percent silt; 22 percent clay; moderate medium subangular blocky parts to moderate fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots throughout and common fine roots throughout; many very fine tubular and common fine tubular pores; 22.0 Percent Clay; 20.0 Percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 7.2, pH meter; abrupt smooth boundary.

A--15 to 34 centimeters (5.9 to 13.4 inches); very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2), moist; 20 percent sand; 58 percent silt; 22 percent clay; moderate medium subangular blocky parts to moderate fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 22.0 Percent Clay; 20.0 Percent Sand; noneffervescent, by HCl, 1 normal; neutral, pH 7.2, pH meter; clear wavy boundary.

Bt--34 to 85 centimeters (13.4 to 33.5 inches); brown (10YR 4/3) clay loam, dark brown (10YR 3/3), moist; 30 percent sand; 33 percent silt; 37 percent clay; moderate medium prismatic parts to strong medium angular blocky structure; very hard, extremely firm, moderately sticky, moderately plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 75 percent distinct 10YR 2/1), moist, clay films on all faces of peds; 37.0 Percent Clay; 30.0 Percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.5, pH meter; clear wavy boundary.

Btk--85 to 105 centimeters (33.5 to 41.3 inches); grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2), moist; 30 percent sand; 34 percent silt; 36 percent clay; moderate medium prismatic parts to strong medium angular blocky structure; very hard, extremely firm, moderately sticky, moderately plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 30 percent distinct 10YR 2/1), moist, clay films on all faces of peds and 40 percent distinct 10YR 3/1), moist, clay films on all faces of peds; carbonate, finely disseminated throughout and 5 percent fine irregular weakly cemented carbonate masses throughout and 15 percent medium irregular weakly cemented carbonate masses throughout; 36.0 Percent Clay; 30.0 Percent Sand; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.1, pH meter; gradual wavy boundary.

C1--105 to 162 centimeters (41.3 to 63.8 inches); light olive brown (2.5Y 5/3) clay loam, olive brown (2.5Y 4/3), moist; 40 percent sand; 26 percent silt; 34 percent clay; massive; hard, very firm, moderately sticky, moderately plastic; common very fine roots throughout; common very fine tubular pores; carbonate, finely disseminated throughout and 15 percent fine irregular weakly cemented carbonate masses throughout and 5 percent medium irregular weakly cemented carbonate masses throughout; 34.0 Percent Clay; 40.0 Percent Sand; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.0, pH meter.

C2--162 to 175 centimeters (63.8 to 68.9 inches); light olive brown (2.5Y 5/3) clay loam, olive brown (2.5Y 4/3), moist; 45 percent sand; 23 percent silt; 32 percent clay; massive; slightly hard, friable, moderately sticky, moderately plastic; common very fine roots throughout; 2 percent fine irregular weakly cemented carbonate masses throughout; 32.0 Percent Clay; 45.0 Percent Sand; slight effervescence, by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter.

C3--175 to 200 centimeters (68.9 to 78.7 inches); light olive brown (2.5Y 5/3) loam, olive brown (2.5Y 4/3), moist; 50 percent sand; 30 percent silt; 20 percent clay; massive; soft, very friable, slightly sticky, slightly plastic; 20.0 Percent Clay; 50.0 Percent Sand; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 4 2016
Describer: Perry Sullivan;Jeanne Heilig;Brianna Wegner
NEON Plot ID: NOGP_030
Site ID: S2016ND059029

Pedon ID: S2016ND059029
Site Note:
Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.
Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Amor
Classification: Fine-loamy, mixed, superactive, frigid Typic Haplustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on shoulder of nose slope of ridge on plains
Upslope Shape: convex
Cross Slope Shape: convex
Particle Size Control Section: 25 to 74 cm.
Description origin: NASIS
Diagnostic Features: mollic epipedon 0 to 37 cm.
paralithic contact 74 to 200 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:
Pit Location:
Quad Name:
Std Latitude: 46.7909850
Std Longitude: -100.9218220
Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 353325 meters
UTM Northing: 5183731 meters
Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Grassland rangeland
Existing Vegetation:
Parent Material: residuum weathered from calcareous sandstone
Bedrock Kind: Calcareous sandstone
Bedrock Depth: 74 centimeters
Bedrock Hardness: very weakly cemented
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Top Depth (cm)	Bottom Depth (cm)	Restriction Kind	Restriction Hardness
74	200	bedrock, paralithic	Very weakly cemented

Cont. Site ID: S2016ND059029 **Pedon ID:** S2016ND059029

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
12.0	572.0	30	6.0			394	128	well		

A--0 to 20 centimeters (0.0 to 7.9 inches); dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2), moist; 40 percent sand; 38 percent silt; 22 percent clay; moderate medium subangular blocky parts to moderate medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine roots throughout and many fine roots throughout; common very fine tubular and common fine tubular pores; 40.0 Percent Sand; 22.0 percent Clay; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter; clear wavy boundary.

Bw--20 to 37 centimeters (7.9 to 14.6 inches); brown (10YR 4/3) loam, dark brown (10YR 3/3), moist; 50 percent sand; 30 percent silt; 20 percent clay; moderate medium prismatic parts to moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many very fine roots throughout and many fine roots throughout; common very fine tubular and common fine tubular pores; carbonate, finely disseminated throughout; 20.0 Percent Clay; 50.0 Percent Sand; slight effervescence, by HCl, 1 normal; slightly alkaline, pH 7.6, pH meter; clear wavy boundary.

Bk--37 to 74 centimeters (14.6 to 29.1 inches); light olive brown (2.5Y 5/3) fine sandy loam, olive brown (2.5Y 4/3), moist; 57 percent sand; 27 percent silt; 16 percent clay; weak medium prismatic parts to moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; carbonate, finely disseminated throughout; 16.0 Percent Clay; 57.0 Percent Sand; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.0, pH meter; clear wavy boundary. A few small oxidized iron redoximorphic features were present at the very bottom of the Bk horizon directly above and adjacent to the soft sandstone bedrock parent material. These redoximorphic features formed due to subsurface water flowing laterally along the top of the beds.

Cr--74 to 200 centimeters (29.1 to 78.7 inches); very weakly cemented Calcareous sandstone bedrock; carbonate masses along lamina or strata surfaces; strong effervescence, by HCl, 1 normal. The Cr horizon is soft sandstone sedimentary beds that were encountered at 74 cm below the surface. The Cr horizon has strong effervescence and numerous soft carbonate masses between the strata of the paralithic bedrock.

PEDON DESCRIPTION -- NEON Site NOGP

Print Date: Mar 20 2018
Description Date: May 3 2016
Describer: John Kempenich;Kyle Thomson
NEON Plot ID: NOGP_041
Site ID: S2016ND059030

Pedon ID: S2016ND059030
Site Note:
Pedon Note: This pedon description is being entered from field observations as part of the NEON Sampling Initiative. Pedons were described at the USDA-ARS-Northern Great Plains Research Laboratory located in Morton County in North Dakota.
Lab Source ID:
Lab Pedon #:
Soil Name as Described/Sampled:
Classification:
Soil Name as Correlated: Bryant
Classification: Fine-silty, mixed, superactive, frigid Typic Haplustolls
Pedon Type: undefined observation
Pedon Purpose: research site
Taxon Kind: series
Associated Soils:
Physiographic Division: Interior Plains
Physiographic Province: Great Plains Province
Physiographic Section: Missouri plateau, glaciated
State Physiographic Area:
Local Physiographic Area:
Geomorphic Setting: on backslope of side slope of hillslope on plains
Upslope Shape: linear
Cross Slope Shape: linear
Particle Size Control Section: 25 to 100 cm.
Description origin: NASIS
Diagnostic Features: mollic epipedon 0 to 25 cm.
cambic horizon 25 to 41 cm.
calcic horizon 41 to 128 cm.
lithologic discontinuity 53 to 128 cm.
lithologic discontinuity 128 to 200 cm.

Country:
State: North Dakota
County: Morton
MLRA: 54 -- Rolling Soft Shale Plain
Soil Survey Area: ND059 -- Morton County, North Dakota
5-DIC -- Dickinson, North Dakota
Map Unit:
Pit Location:
Quad Name:
Std Latitude: 46.7813280
Std Longitude: -100.9217980
Latitude:
Longitude:
Datum: WGS84
UTM Zone: 14
UTM Easting: 353301 meters
UTM Northing: 5182658 meters
Primary Earth Cover: Grass/herbaceous cover
Secondary Earth Cover: Grassland rangeland
Existing Vegetation:
Parent Material: loess over till
Bedrock Kind:
Bedrock Depth:
Bedrock Hardness:
Bedrock Fracture Interval:
Surface Fragments:
Description database: MLRA10_StPaul

Cont. Site ID: S2016ND059030 **Pedon ID:** S2016ND059030

Slope (%)	Elevation (meters)	Aspect (deg)	MAAT (C)	MSAT (C)	MWAT (C)	MAP (mm)	Frost-Free Days	Drainage Class	Slope Length (meters)	Upslope Length (meters)
5.0	579.0	135	6.0			394	128	well		

A--0 to 14 centimeters (0.0 to 5.5 inches); very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2), moist; 30 percent sand; 45 percent silt; 25 percent clay; moderate medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout and common medium roots throughout and common fine roots throughout; common very fine tubular and common medium tubular and common fine tubular pores; 1 percent nonflat subrounded indurated 20 to 76-millimeter Granite fragments; noneffervescent, by HCl, 1 normal; neutral, pH 7.2, pH meter; clear wavy boundary.

Bw1--14 to 25 centimeters (5.5 to 9.8 inches); dark grayish brown (2.5Y 4/2) loam, very dark grayish brown (2.5Y 3/2), moist; 30 percent sand; 45 percent silt; 25 percent clay; weak medium prismatic parts to moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; noneffervescent, by HCl, 1 normal; neutral, pH 7.3, pH meter; clear wavy boundary.

Bw2--25 to 41 centimeters (9.8 to 16.1 inches); light olive brown (2.5Y 5/3) loam, olive brown (2.5Y 4/3), moist; 30 percent sand; 45 percent silt; 25 percent clay; weak medium prismatic parts to moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; noneffervescent, by HCl, 1 normal; slightly alkaline, pH 7.4, pH meter; clear wavy boundary.

Bk1--41 to 53 centimeters (16.1 to 20.9 inches); light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2), moist; 22 percent sand; 54 percent silt; 24 percent clay; weak medium prismatic parts to moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; carbonate, finely disseminated throughout and 1 percent fine irregular weakly cemented carbonate masses throughout; violent effervescence, by HCl, 1 normal; slightly alkaline, pH 7.8, pH meter; clear wavy boundary.

2Abk--53 to 62 centimeters (20.9 to 24.4 inches); grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2), moist; 15 percent sand; 63 percent silt; 22 percent clay; weak coarse prismatic parts to moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; carbonate, finely disseminated throughout and 1 percent fine irregular weakly cemented carbonate bands throughout; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.0, pH meter; clear wavy boundary.

2Bk2--62 to 80 centimeters (24.4 to 31.5 inches); light olive brown (2.5Y 5/3) silt loam, olive brown (2.5Y 4/3), moist; 15 percent sand; 63 percent silt; 22 percent clay; weak coarse prismatic parts to weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; carbonate, finely disseminated throughout and 2 percent fine irregular weakly cemented carbonate masses throughout; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.0, pH meter; gradual wavy boundary.

2Bk3--80 to 128 centimeters (31.5 to 50.4 inches); light olive brown (2.5Y 5/3) silt loam, olive brown (2.5Y 4/3), moist; 25 percent sand; 53 percent silt; 22 percent clay; weak coarse prismatic parts to weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots throughout and common fine roots throughout; common very fine tubular and common fine tubular pores; 4 percent fine prominent irregular 10YR 5/8), moist, masses of oxidized iron; carbonate, finely disseminated throughout and 2 percent medium irregular weakly cemented carbonate masses throughout; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.0, pH meter. Redoximorphic features in the 2Bk3 horizon formed in the lower part of the horizon adjacent to and just above the glacial till parent material.

3C--128 to 200 centimeters (50.4 to 78.7 inches); light yellowish brown (2.5Y 6/4) clay loam, light olive brown (2.5Y 5/4), moist; 25 percent sand; 42 percent silt; 33 percent clay; massive; hard, very firm, very sticky, very plastic; carbonate, finely disseminated

throughout and 5 percent medium irregular weakly cemented carbonate masses throughout; violent effervescence, by HCl, 1 normal; moderately alkaline, pH 8.0, pH meter.