



NEON Site Level Plot Summary

MOAB (MOAB)

Document Information

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Site Background

The MOAB NEON site is on the Colorado Plateau about 20 miles south of the town Moab, Utah. The area drains northwesterly into the Colorado River via Hatch Wash and its tributaries. Most of the site is in Major Land Resource Area (MLRA) 35 – Colorado Plateau. The northeastern part of the site is in MLRA 36 – Southwestern Plateaus, Mesas, and Foothills. The entire site is about 12,460 acres in size. The site is inventoried in the Canyonlands Area, Utah Soil Survey (UT633) published January, 1991.

Site Information

Elevation on the site ranges from about 1700 m above sea level in Hatch Wash to about 2000 m on the Joe Wilson Canyon rim. Parent materials include eolian deposits from sandstone mixed with alluvium and slope alluvium derived from sandstone, siltstone, and shale. Major geologic units are the Jurassic age Morrison, Entrada, Carmel, and Navajo Formations.

The major landforms are structural benches with intervening escarpments. Alluvial fans and/or flats are superimposed on the benches. The fans contain eolian deposits and local alluvium reworked by slope processes. Stream terraces and bars occur along and in larger drainageways, but these landforms are of minor extent and were included in the site plot sampling

The site is on BLM administered property and the overarching land use is rangeland. The major plant communities are big sagebrush-perennial grass, perennial grass-fourwing saltbush, and pinyon-Utah juniper communities. The most extensive ecological sites on the site are:

Semidesert Sand (Fourwing Saltbush), R035XY212UT

Semidesert Sandy Loam (4-Wing Saltbush), R035XY215UT

Semidesert Shallow Sandy Loam (Utah Juniper, Blackbrush), R035XY236UT

Upland Loam (Basin Big Sagebrush), R035XY306UT

Major soil series on the site are Begay, Ignacio, Mivida, Rizno, and Windwhistle.

Analysis of Plots for Sampling

Sampled plots were selected from the 34 monitoring plots established on the NEON site. Landform, soil map unit, geology, and ecological site were the main considerations used in selecting sampling locations. Additionally, size and uniformity of the map unit polygon was considered.

There are 14 soil map units contained in the NEON site. Seven of these map units occur in the NEON pre-selected plots, and eleven plots were sampled within these soil map units. The 11 plots occur in relatively large areas of fairly consistent soils that did not exhibit ecotone transitions. The following table summarizes both the sampled and non-sampled soil map units. The sampled map units cover approximately 76% of the NEON site. Map units that were not sampled represent 24% of the area of the NEON site.

Soil map units sampled		
Map unit symbol	Map Unit Name	Percent Total Acres (12,465 acres)
7	Begay fine sandy loam, 2 to 6 percent slopes	8
8	Begay fine sandy loam, moist, 2 to 6 percent slopes	9
10	Begay-Rock outcrop-Mido complex, 2 to 35 percent slopes	31
41	Ignacio-Leanto fine sandy loams, 2 to 6 percent slopes	3
52	Mivida fine sandy loam, 2 to 8 percent slopes	4
70	Rizno-Rock outcrop complex, 3 to 15 percent slopes	14
104	Windwhistle-Sazi very fine sandy loams, 1 to 3 percent slopes	7

Soil map units not sampled		
Map unit symbol	Map Unit Name	Percent Total Acres (12,465 acres)
5	Barnum silty clay loam, 0 to 3 percent slopes	4
19	Cahona fine sandy loam, 2 to 8 percent slopes	1
51	Mido loamy fine sand, dry, 2 to 8 percent slopes	2
66	Redbank fine sandy loam, dry, 0 to 3 percent slopes	0
68	Redbank very fine sandy loam, alkali, 0 to 3 percent slopes	3
72	Rock outcrop	8
74	Rock outcrop-Rizno complex, 3 to 15 percent slopes	6

Plot Findings

Plots MOAB_003, MOAB_025, MOAB_028, and MOAB_011 are on an upper structural bench north and east of the NEON tower. Plot MOAB_011 is on a gradual slope descending to lower bench on which the tower sits. The remaining three plots are on the top of the cliffs above Joe Wilson Canyon. Subsequent to the publication of the Canyonlands Area soil survey, it was determined that these areas are more properly classified as having an ustic soil moisture regime (SMR) that borders on an aridic SMR. The previous paradigm placed these soils in the drier aridic SMR. The soil series names used in the Canyonlands soil survey for this area no longer fit the soils due to this change in soil correlation concepts. For the purposes of this summary these four sites will be discussed separately from the remainder of the plots.

MOAB_003 (Soil Sample Pedon ID S2016UT037006) is on a structural bench above Joe Wilson Canyon at an elevation of approximately 2019 meters in a delineation of Rizno-Rock outcrop complex, 3 to 15 percent slopes. The parent material is mainly residuum from the sandstone, siltstone and mudstone of the Salt Wash member of the Morrison Formation. The soil is very shallow to weathered sandstone with hard sandstone occurring at a depth of 46 cm. The soil texture is clay loam in most of the profile with a thin horizon of loam at the surface. The soil is calcareous throughout the profile and has a moderately alkaline pH reaction. The present vegetation is a stand of Utah juniper and two-needle pinyon with lower shrubs in the understory. The plot supports a well-developed microbiotic crust between the shrubs and trees. The soil-plant relationships are consistent with those described by the assigned ecological site (R035XY315UT).

MOAB_025 (Soil Sample Pedon ID S2016UT037005) is on a structural bench above Joe Wilson Canyon at an elevation of approximately 2042 meters in a delineation of Rizno-Rock outcrop complex, 3 to 15 percent slopes. The parent material is eolian material overlying residuum from siltstone and mudstone of the Salt Wash member of the Morrison Formation. The soil is deep and, below the loamy cap of eolian material and some local alluvium, is silt loam, the clay content increasing to a silty clay loam at about 48 cm depth. This soil is deeper and more developed than usually expected on this landform position but could be somewhat sheltered or forming in less resistant strata. The soil is calcareous throughout the profile with the strongest expression of accumulated carbonates between the depths of 7 and 48 cm.

MOAB_028 (Soil Sample Pedon ID S2016UT037004) is on a structural bench above Joe Wilson Canyon at an elevation of approximately 2006 meters in a delineation of Rizno-Rock outcrop complex, 3 to 15 percent slopes. The parent material is mainly residuum from the siltstone and mudstone of the Salt Wash member of the Morrison Formation. The soil is shallow to weathered mudstone with hard mudstone occurring at a depth of 35 cm. The soil texture is silty clay loam throughout of the profile. The present vegetation is a stand of Utah juniper and two-needle pinyon with lower shrubs and forbs in the understory. The plot supports a well-developed microbiotic crust between the shrubs and trees. The soil-plant relationships are consistent with those described by the assigned ecological site (R035XY315UT).

MOAB_011 (Soil Sample Pedon ID S2016UT037002) is on a structural bench south of Looking Glass Rock at an elevation 1815 meters in delineation of Begay fine sandy loam, moist, 2 to 6 percent slopes. The parent material is mainly eolian deposits derived from sandstone. The soil is

deeper than 1 meter and has an accumulation of calcium carbonate below 35 cm becoming more strongly expressed with increasing depth. The soil texture is fine sandy loam and very fine sandy loam in the upper part of the profile and loam in the lower part. The texture change may be due to silt-sized carbonates in the lower part of the soil profile. The present vegetation is dominated by big sagebrush with an understory of lower shrubs and perennial grasses with a few forbs. There is a moss dominated microbiotic crust around the base of the sagebrush. The plants and soil are consistent with the assigned ecological site (R035XY308UT).

NEON plots correlated to an aridic SMR

MOAB_002 (Soil Sample Pedon ID S2016UT037009) is on a structural bench south of Hatch Wash at an elevation 1776 meters in a delineation of Begay fine sandy loam, moist, 2 to 6 percent slopes. The parent material is mainly eolian deposits and local alluvium. The plot is located on the side slope of a small rise, possibly a stabilized dune. The soil is more than 100 cm deep. The lower part of the profile has some accumulation of calcium carbonates below 52 cm evidenced by soft masses of calcium carbonate throughout these lower horizons. The soil sampled fits the Begay series and the soils and plants are consistent with the Semidesert Sandy Loam (Fourwing Saltbush) ecological site (R035XY215UT).

MOAB_006 (Soil Sample Pedon ID S2016UT037003) is on a structural bench southwest of the tower at an elevation 1757 meters in a delineation of Begay-Rock outcrop-Mido complex, 2 to 35 percent slopes. The plot contains the top of the bench, a narrow band of small dunes and the upper part of the slope going down into Hatch Wash. The soil pit is on the top of the bench. The parent material is mainly eolian deposits over residuum from the sandstones of the Dewey Bridge member of the Carmel Formation. This soil has a thicker cap of eolian material than most of the other soils sampled. The soil has an accumulation of translocated clay between depths of 38 and 76 cm evidenced by a slight increase in clay content and clay bridging between the sand grains. The next horizon, from 76 to 96 cm, has evidence of translocated calcium carbonates in the form of carbonate coatings around rock fragments. Hard sandstone occurs at 66 cm. The vegetation community is perennial grasses with scattered shrubs. The soil sampled fits the Windwhistle series and the soils and plants are consistent with the Semidesert Sandy Loam ecological site.

MOAB_010 (Soil Sample Pedon ID S2016UT037010) is on an alluvial fan remnant on a structural bench just south of Joe Wilson Canyon at an elevation 1815 meters in a delineation of Begay fine sandy loam, 2 to 6 percent slopes. The parent material is local alluvium and eolian deposits. The soil is more than 100 cm deep. The texture is fine sandy loam in most of the profile, except the 41 to 77 cm horizon which is loamy fine sand. The lower part of the profile has some accumulation of calcium carbonates below 41 cm evidenced by fine soft masses of calcium carbonate throughout these lower horizons. The soil sampled fits the Begay series and the soils and plants are consistent with the Semidesert Sandy Loam ecological site.

MOAB_013 (Soil Sample Pedon ID S2016UT037007) is on a structural bench south of the tower at an elevation 1771 meters in a delineation of Rizno-Rock outcrop complex, 3 to 15 percent slopes. The parent material is mainly eolian deposits over residuum from the sandstones of the Dewey Bridge member of the Carmel Formation. The soil has an accumulation of translocated

clay between depths of 9 and 49 cm evidenced by a slight increase in clay content and clay films covering faces of pedons. The lower part of this layer also has evidence of translocated calcium carbonates. Weathered sandstone is at a depth of 46 cm; hard sandstone occurs at 66 cm. The vegetation community is perennial grasses with scattered shrubs. The soil sampled is similar to the Windwhistle series and the soils and plants are consistent with the Semidesert Sandy Loam ecological site.

MOAB_015 (Soil Sample Pedon ID S2016UT037001) is on a structural bench southwest of Looking Glass Rock at an elevation 1768 meters in a delineation of Ignacio-Leanto fine sandy loams, 2 to 6 percent slopes. The plot overlaps a drainage bottom, the side slope of the drainage, and the interfluvium. The soil pit is on the interfluvium which appears to be the dominant landform component in the plot. The parent material is mainly eolian deposits over residuum from the sandstones of the Dewey Bridge member of the Carmel Formation. The soil has an accumulation of translocated clay between depths of 5 and 44 cm evidenced by a slight increase in clay content and clay films covering faces of pedons. Weathered, moderately cemented sandstone is at a depth of 61 cm. The vegetation community is perennial grasses with scattered shrubs. The soil sampled is similar to the Windwhistle series and the soils and plants are consistent with the Semidesert Sandy Loam ecological site.

MOAB_016 (Soil Sample Pedon ID S2016UT037008) is on a structural bench south of Hatch Wash at an elevation 1771 meters in a delineation of Mivida fine sandy loam, 2 to 8 percent slopes. The parent material is mainly eolian deposits and local alluvium. The soil has an accumulation of translocated clay between depths of 7 and 52 cm evidenced by an increase in clay content and clay films covering faces of pedons. The next horizon from 52 to more than 100 cm has evidence of translocated calcium carbonates in the form of soft nearly spherical masses throughout the horizon. The upper part of this horizon is weakly cemented, but the cementation is not continuous. The vegetation community is perennial grasses with scattered shrubs. The soil sampled fits the Barx series and the soils and plants are consistent with the Semidesert Sandy Loam ecological site.

MOAB_046 (Soil Sample Pedon ID S2016UT037011) is on a structural bench south of Joe Wilson Canyon and west of the tower at an elevation 1784 meters in a delineation of Windwhistle-Sazi very fine sandy loams, 1 to 3 percent slopes. This plot is within the airshed of the tower and was sampled with a hand auger. The parent material is eolian deposits over local alluvium. The soil texture is fine sandy loam in the upper 37 cm over loam below 37 cm. Weathered sandstone occurs at 92 cm. The lower part of the profile has an accumulation of calcium carbonate below 37 cm evidenced by calcium carbonate coatings around rock fragments. The vegetation is winterfat, broom snakeweed, fourwing saltbush, blue gramma and other perennial grasses. The soil sampled fits the Sazi series and the soils and plants are consistent with the Semidesert Sandy Loam ecological site.