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NEON Site-Level Plot Summary
Mountain Lake Biological Station (MLBS)

Document Information

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Site Background

The Mountain Lake Biological Station (MLBS) site is located in Major Land Resource Area (MLRA) 128–The Southern Appalachian Ridges and Valleys and encompasses the Mountain Lake Biological Station and portions of the Jefferson National Forest (JNF). All data in this summary is based upon the current NEON sampling boundary, which totals approximately 2,752 acres.

Site Information

Elevation ranges from 800 to 1,160 meters (2620 to 3800 feet) above sea level.

The parent materials at the MLBS site are residuum, colluvium, and local alluvium derived from Lower Devonian and Silurian Formations, Undivided, which include the Millboro Shale (black fissile shale) and Needmore Formations; and the Juniata, Reedsville, Trenton, and Eggleston Formations.

Forest land dominates land use. Oak-hickory forest dominates plant communities.

Major soil series that are mapped on the sites include Sheloctoa, Lily, Bailegap, Jefferson, and Fluvaquents, Berks, and Weikert. These soils are on the following landforms: residual mountaintops; colluvial foot slopes and saddles on the middle and lower third of mountain slopes; and low stream terraces.

Analysis of Plots for Sampling

Four features were identified as criteria for selecting plots to sample: soil map unit, geology, landform, and major vegetative communities. Each unique combination of these four features was labeled as a landform setting. Soil mapping on the entire MLBS NEON site consisted of 46 different soil map units. NEON offered plots to sample in 34 out of the 46 map units and plots were sampled in 7 map units. The analysis resulted in 10 of the pre-selected plots being selected for field description, field sampling, and lab characterization.

Four plots were sampled within the Mountain Lake Biological Station property and six plots within the Jefferson National Forest.

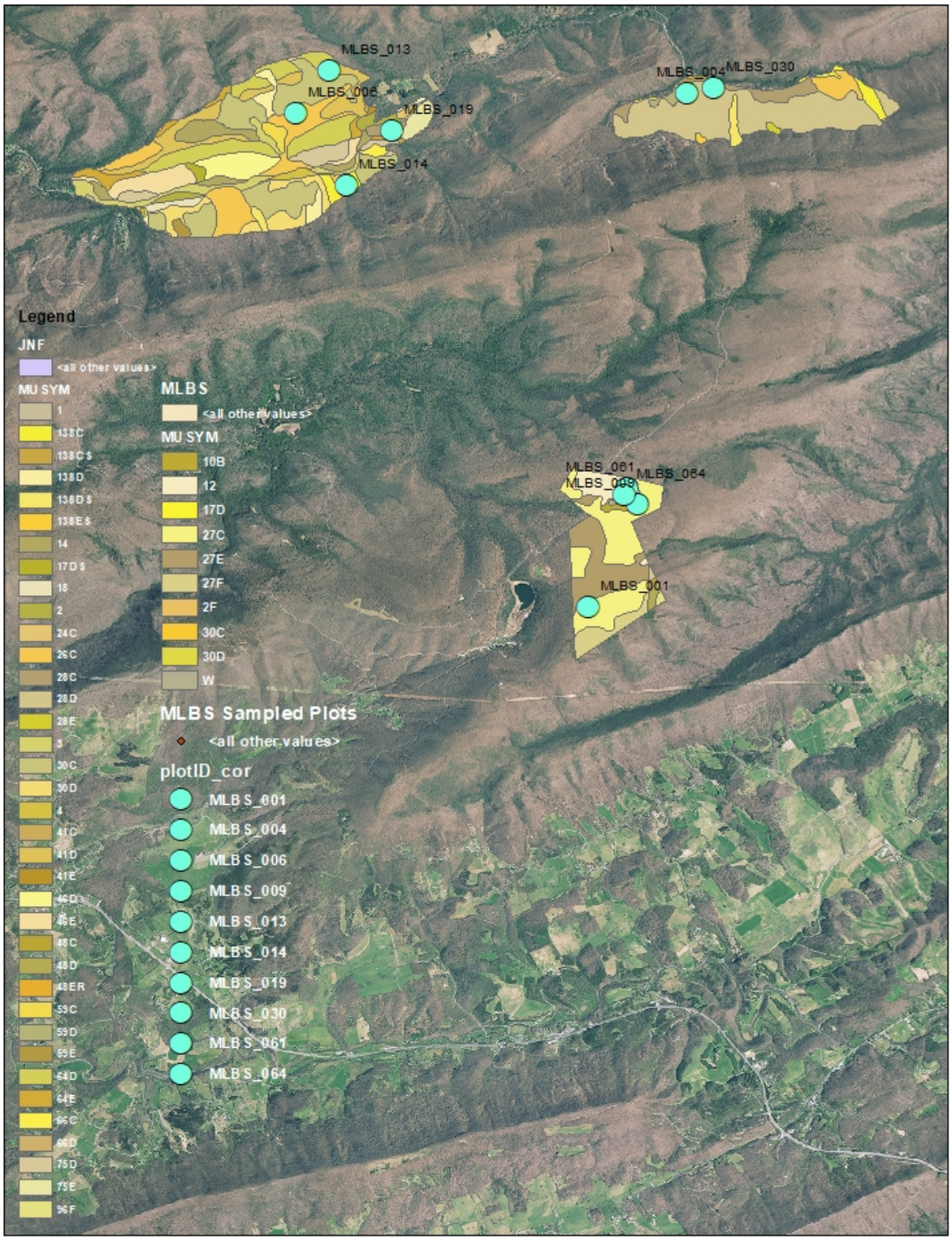

Figure 1. Map representing the sampled plots for the MLBS NEON Site within Mountain Lake Biological Station property and the Jefferson National Forest. MUSYM: map unit symbol.

Approximately 4 map units comprising 30 percent of the area represented by the MLBS NEON pre-selected plots were not sampled:

Map unit symbol	Location*	Soil Survey Area**	Map Unit Name	% Total site area
27E	MLBS	VA071	Lily-Bailegap complex, very stony, 15 to 35 percent slopes	9%
27F	MLBS	VA071	Lily-Bailegap complex, very stony, 35 to 65 percent slopes	3%
30C	JNF	VA606	Laidig cobbly fine sandy loam, 3 to 15 percent slopes	15%
64D	JNF	VA606	Brushy extremely gravelly loam, 15 to 35 percent slopes	3%
			Total	**30%**

*Location provides sub-site ownership: MLBS is Mountain Lake Biological Station; JNF is Jefferson National Forest

**Soil Survey Areas: VA071 is Giles County, VA; VA606 is Jefferson National Forest

Approximately 70 percent of the area comprising 7 map units represented by the MLBS NEON pre-selected plots was sampled:

Map unit symbol	Locat-ion*	Soil Survey Area**	Map Unit Name	% Total site area
12	MLBS	VA071	Fluvaquents, nearly level	9%
26C	JNF	VA606	Jefferson loam, 3 to 15 percent slopes	14%
27C	MLBS	VA071	Lily-Bailegap complex, very stony, 2 to 15 percent slopes	20%
28C	JNF	VA606	Shelocta channery silt loam, 3 to 15 percent slopes	3%
28D	JNF	VA606	Shelocta channery silt loam, 15 to 35 percent slopes	18%
41D	JNF	VA606	Berks-Weikert complex, 15 to 35 percent slopes	3%
59D	JNF	VA606	Gilpin channery silt loam, 15 to 35 percent slopes	3%
			Total	**70%**

*Location provides sub-site ownership: MLBS is Mountain Lake Biological Station; JNF is Jefferson National Forest

**Soil Survey Areas: VA071 is Giles County, VA; VA606 is Jefferson National Forest

Plot Findings

The selected plots are somewhat representative of the map units in which they occur. Some fall within the Range in Characteristics (RIC) of the individual major component, except for a few outliers (noted below). Most of the soils identified during sampling are common dissimilar or similar inclusions for the map unit. In some cases, the soil sampling crew could not dig deep enough to classify the soil to the series level or the classification does not fit existing soil series.

A total of 10 plots were sampled within the MLBS NEON boundary. The six plots sampled in the Jefferson National Forest were MLBS_013, MLBS_019, MLBS_006, MLBS_014,

MLBS_004, MLBS_030. The remaining four plots sampled were on the Mountain Lake Biological Station. They included MLBS_001, MLBS_009, MLBS_061, MLBS_064. Plots MLBS_061 and MLBS_064 were tower plots allowing only soil boring samples collected by hand auger.

Landforms—Soils at NEON Plots MLBS_030, 004, 061, 064, 019, 014, and 009 formed in colluvium; plot MLBS_006 formed in alluvium; plot MLBS_013 formed in colluvium over residuum; and plot MLBS_001 formed in residuum. Of the plots sampled, 70% developed in colluvium, 10% in residuum, 10% in colluvium over residuum, and 10% in alluvium.

Summary of Soils

Seventy percent of the sites contained organic horizons. These horizons ranged from 1 to 8 cm in thickness. The O horizons are accounted for in the aggregated NASIS horizon data. Where thickness allowed, the O horizons were sampled for organic matter content and bulk density using the Frame Bulk Density method.

Sampled soils were dominantly colluvium. Grimsley soil on the mountain slopes (MLBS_014 and 030) formed in colluvium. These soils contain greater than 35% rock fragments in each horizon and have an argillic horizon with a field estimated clay content of 27 to 40%.

The remaining plots that formed in colluvium were more difficult to correlate to a soil series either because they could not be classified to the soil series level due to fragment content restrictions and unknown mineralogy, or because the classification did not correlate to an existing soil series. Those plots are MLBS_004, 009, 061, 019 and 064. None of the plots could be correlated to named map unit components, but similar soils could be identified and are provided below.

Plot MLBS_004 was formed in colluvium and has a loamy-skeletal particle size class. It also has an argillic horizon, but the closest fit is Berks, which is a loamy-skeletal inceptisol (i.e. no argillic horizons).

Plot MLBS_009 and MLBS_061 formed in colluvium, have a fine-loamy particle size class, and are deep or very deep to bedrock. They also have an argillic horizon and best fit the Escatawba soil series, except that Escatawba soils were formed in colluvium from shale, sandstone and limestone and no limestone was observed in this location.

Plot MLBS_019 was formed in colluvium, has a fine-loamy particle size class, and is moderately deep to bedrock. It also has an argillic horizon and best fits Gilpin. Gilpin actually formed in residuum, but also occurs on mountain side slopes.

Plot MLBS_064 was formed in colluvium, has a fine-loamy particle size class, and is deep or very deep to bedrock. The soil lacks an argillic horizon, but is similar enough to Jefferson, which does have an argillic horizon. The difference is that Jefferson shows just a little more profile development (i.e. argillic horizons).

Plot MLBS_001 formed in residuum of sandstone and closely fits the Hazleton soil series. These soils lack an argillic horizon and have more than 35 percent sandstone fragments in the subsoil.

Plot MLBS_006 was formed in alluvium but could only be described to 48 cm due to water filling the pit and could not be classified to the soil series level. Philo would be a possible series for this pedon. Philo soils formed in recent alluvium (flood plains) derived primarily from sandstone and shale, but may contain less clay than the soil at this plot (identified as fine-loamy instead of coarse-loamy like Philo). Philo also has low-chroma redoximorphic features closer to the surface.

Plot MLBS_013 was located in the Berks-Weikert complex, 15 to 35 percent slopes map unit. The soil does not correlate to the map unit components. It has chert throughout the profile and an estimated clay percent of 12 to 27%. This suggested limestone influence. It has fewer rock fragments than Berks and Weikert soils, which both contain shale, siltstone, and sandstone fragments (no limestone parent material).