



NEON Site-Level Plot Summary

Blandy Experimental Farm (BLAN)

Document Information

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Site Background

The Blandy Casey Tree Farm and Blandy Experimental Farm are approximately 10 miles east of Winchester Virginia. These sites are located within Major Land Resource Area (MLRA) 147 Northern Appalachian Ridges and Valleys. The Blandy Casey Tree site is approximately 738 acres and consists of soils weathered or derived from limestone, dolostone and shale geology. The Blandy Experimental Farm is approximately 665 acres and is derived mainly from limestone and dolostone geology.

Site Information

Elevation ranges from approximately 400 feet to 650 feet above sea level.

The parent materials at the Blandy Experimental Farm are Cambrian-Ordovician aged and have Limestone/Dolostone lithologies. The four sample plots on this location have residual soils and are all within soil mapping delineations of 35B—Poplimento silt loam, 3-8 percent slopes.

The parent materials at the Casey Tree Farm are Cambrian Dolostone/Limestone for the two most western plot locations, which are within Poplimento-Webbtown complex map unit delineations. The eastern portion of the property has soils underlain by Cambrian Dolostone/Shale. These soils include eolian, alluvial and colluvial parent materials and include Chagrin, Lakin, Monongahela-Braddock, Thurmont and Timberville soils.

Six of the 13 sites at Casey Tree Farm are in forest while the remaining 7 have been cleared for agricultural purposes. Plant communities in wooded sites are dominated by box elder, black oak, tulip poplar and paw paw, with black walnut, elm, oak and hickory as less common species. The plots at the Blandy Experimental Farm are heavy brush and oats.

Analysis of Plots for Sampling

The soil mapunit, geology, landform, and major vegetative communities were four features identified for each plot during the plot evaluation and selection process. Each unique combination of these four features was labeled as a ‘setting’. Plots that represented a unique

setting were identified and chosen for sampling. Where multiple plots occurred in the same setting, ease of plot access was considered, and then one of those particular plots was chosen.

The two sampled plots at Blandy Experimental Farm are located within the airshed of a tower site and could only be augered, hence, no pit descriptions are available. Several auger holes were needed to accommodate the 500-700g minimum sample weight required. Clods and bulk density samples were not taken at these plots. Pits were used only at Casey Tree Farm and were dug, described, sampled to a depth of 1 meter. Each soil pit generally had 4 horizons within the 1 meter depth, but this varied from plot to plot. Bulk density samples were collected from all described soil horizons. The sampled map units represent 66.7% of the NEON site area at Casey Tree Farm and 50.4% at the Experimental Farm (Table 1).

The soils at both sites are dominantly well drained and deep or very deep to bedrock, with varying amounts of rock fragments. The natural fertility of the soils is generally moderate to high. The landforms are foothills of the Blue Ridge Mountains. Landform positions at Casey Tree Farm are mostly terraces and the side slopes of these terraces. Stones and cobbles do occur on the surface in some places but the vast majority of these sites are free of surface stones and cobbles. More information about the soils at the BLAN site can be found on the Web Soil Survey and in the Soil Survey Clarke County, Virginia.

Map Unit Symbol	Map Unit Name	Property	% Total site area
35B	Poplimento silt loam, 3 to 8 percent slopes	Experimental Farm	50.4
	Total Experimental Farm		50.4
21B	Lakin loamy sand, 3 to 8 percent slopes	Casey Tree Farm	4.3
38B	Poplimento-Webbtown complex, 3 to 8 percent slopes	Casey Tree Farm	1.3
26C	Monongahela-Braddock complex, 8 to 15 percent slopes	Casey Tree Farm	9.5
26B	Monongahela-Braddock complex, 3 to 8 percent slopes	Casey Tree Farm	2.0
55D	Udults-Udalfs association, 15 to 45 percent slopes	Casey Tree Farm	7.3
51B	Timberville silt loam, 0 to 7 percent slopes	Casey Tree Farm	6.5
50B	Thurmont gravelly loam, 3 to 8 percent slopes	Casey Tree Farm	12.9
52B	Udipsamments, 0 to 8 percent slopes	Casey Tree Farm	10.6
49B	Thurmont loam, 3 to 8 percent slopes	Casey Tree Farm	1.3
10	Chagrin soils	Casey Tree Farm	7.9
39B	Poplimento-Webbtown complex, rocky, 3 to 8 percent slopes	Casey Tree Farm	3.4
	Total Casey Tree Farm		66.7

Table 1. Areal percent of map units represented at the BLAN site, separated into the Blandy Experimental Farm and Casey Tree Farm properties.

Plot Findings

The 15 pedons sampled represent 13 soil map units. The major components are Poplimento, Lakin, Webbtown, Monongahela, Braddock, Thurmont and Timberville soils. Casey Tree Farm had 6 of the 13 plots (46%) in forest, while the other 7 plots (54%) are currently being used for agricultural purposes, mostly in hay or oats. Of the two plots at the Blandy Experimental Farm, one is in heavy brush and the other is in oats. Both plots occur in the same mapunit, but in different delineations. One general observation was that nearly all soils lacked O (organic) horizons, even when wooded. Since many of the plots had higher pH, it is likely that if soils were cleared and limed sometime in the past, the elevated pH is a better environment for biological activity. Earthworms, in particular, are very active in this capacity. High pH soils that are returning to wooded conditions generally lack O horizons, likely until the pH is sufficiently decreased.

Summary of Soils

There were 25 plots available for sampling, and after evaluating the available plots, 15 were selected for sampling (Table 2). There were two plots at the tower airshed located on the Blandy Experimental Farm, of which one was located in scrub/shrub and the other in a field of oats. The other thirteen plots were located at Casey Tree Farm and included 6 forested plots and 7 hay field plots. Forested soils in the Clarke Co. manuscript have organic horizons described. A preliminary NEON site was sampled in 2013 for the series Poplimento and it did describe an O horizon; however, none of the forested sites sampled for this effort had an O horizon described.

Plot	Mapunit Symbol	Mapunit Name
BLAN_001	21B	Lakin loamy sand, 3 to 8 percent slopes
BLAN_002	38B	Poplimento-Webbtown complex, 3 to 8 percent slopes
BLAN_005	26C	Monongahela-Braddock complex, 8 to 15 percent slopes
BLAN_006	26B	Monongahela-Braddock complex, 3 to 8 percent slopes
BLAN_008	55D	Udults-Udalfs association, 15 to 45 percent slopes
BLAN_010	50B	Thurmont gravelly loam, 3 to 8 percent slopes
BLAN_011	51B	Timberville silt loam, 0 to 7 percent slopes
BLAN_012	50B	Thurmont gravelly loam, 3 to 8 percent slopes
BLAN_015	52B	Udipsamments, 0 to 8 percent slopes
BLAN_016	49B	Thurmont loam, 3 to 8 percent slopes
BLAN_017	55D	Udults-Udalfs association, 15 to 45 percent slopes
BLAN_019	10	Chagrin soils
BLAN_020	39B	Poplimento-Webbtown complex, rocky, 3 to 8 percent slopes
BLAN_031	35B	Poplimento silt loam, 3 to 8 percent slopes
BLAN_032	35B	Poplimento silt loam, 3 to 8 percent slopes

Table 2. Sampled plot and corresponding map unit symbol, map unit name, and property on which sample point is located.

Sampled soils were dominantly Poplimento and Thurmont soils, or similar soils. Poplimento soils (4 plots – BLAN_002, BLAN_008, BLAN_031, and BLAN_032) occur on residual

uplands and are over 1.5 meter deep to bedrock. The soils formed in residuum from shale, limestone, siltstone and fine-grain sandstone. These soils have an increase in clay content in the subsoil (i.e. argillic horizon) and are in a fine textural family (i.e. clayey). Of the four plots identified as Poplimento, two (BLAN_031 and BLAN_032) are within the range in characteristics (RIC) for this soil. The other two (BLAN_002 and 008) are considered either taxadjuncts or variants, meaning they either classify the same but are outside of the RIC (variant), or they classify differently but interpret similarly (taxadjunct). Plot BLAN_002 was a Poplimento variant with a paralithic (weathered bedrock) contact at 90 cm. Plot BLAN_008 is coarser textured than the series allows within its range of characteristics. This makes it a taxadjunct to the series.

Thurmont soils were found at plots BLAN_001, BLAN_010, BLAN_012, and BLAN_016. Thurmont soils formed in water-deposited (alluvium) and gravity-deposited (colluvium) materials from the Blue Ridge Mountains and are over 1.5 meters deep to bedrock. These soils have an argillic horizon in the subsoil and are in a fine-loamy textural family (i.e. generally 18-35% clay in the upper part of the subsoil). Soils at plot BLAN_001 were found to be Thurmont, but were within a Lakin loamy sand map unit. Lakin soils formed in wind- or water-deposited, sandy materials. This plot was on a 5% slope near the bottom of the hill and formed in alluvium. The soil has an average of about 30 percent rounded rock fragments throughout. A change in parent material (lithologic discontinuity) was found in the last horizon. The vegetation at the site was in a post-disturbance state and the canopy was dominated by black walnut, black cherry, sycamore, box elder, paw paw, and hackberry. While the site was located in a forest, no organic horizons were observed.

BLAN_010 pit has colors in the subsoil (argillic horizon) that are redder than allowed for the Thurmont series, but this has no adverse impact on interpretations. Rock fragment content is higher than is typical for the series and ranges from about 27% to 50% for the first 3 horizons. Clay content in the lower horizons approaches 60%. The higher rock fragment and clay contents make this pit a Thurmont taxadjunct, meaning that classifies differently, but interprets similarly. This site was in hayland.

Plot BLAN_012 was a forested site and properties described fall within accepted ranges for the Thurmont series with the exception of the lower Bt horizon. Clay content of this horizon was higher than the RIC for Thurmont allows. There were little to no roots below the A horizon (0 – 8 cm). No obvious reason for this was observed. BLAN_016 fits the concept of Thurmont except for the high pH. There is a 6.2 pH at depth with flat limestone rock fragments (channers) throughout the 1-meter profile. This will likely make this a Thurmont Taxadjunct, classifying as an Alfisol instead of Ultisol (and therefore potentially more fertile).

Chagrín soils were identified at BLAN_015 and BLAN_019. Chagrín soils are deep or very deep to bedrock, well drained, and formed in alluvium on flood plains that are draining areas of sandstone, shale, and siltstone. These soils are considered young soils and have little horizon development. At plot BLAN_015 the vegetation was dominated by box elder, black walnut, elm, and paw paw, but no organic horizon was observed. Very few rock fragments were found in the profile. Plot BLAN_019 had characteristics described that fit within the range for the Chagrín series with the exception of the value (soil color) of the Bw horizon, which was darker than is

typical for the soil series. This usually means there is more organic matter incorporated into the horizon than would be typically expected.

Monongahela soils were identified at BLAN_005. These soils formed in old alluvial deposits on terraces. They have an argillic horizon, are in a fine-loamy textural family, (i.e. generally 18-35% clay in the upper part of the subsoil), and have a fragipan (firm to very firm horizon that restricts water and roots). They are very deep with bedrock below 1.5 meters. This soil has a fragipan at 39 cm. This is slightly shallower than is typically observed for the range of characteristics for the series. There were no redoximorphic features (generally, iron depletions or concentrations indicating saturation) described above the fragipan. Textures fit the series range, but colors are a bit darker and redder than allowed in the RIC.

A soil similar to Braddock soils was identified at the BLAN_006 plot. Braddock soils are greater than 1.5 meters to bedrock and are well drained. These soils formed in colluvium and/or alluvium from crystalline rocks and occur at the base of hills, colluvial fans, and on high terraces. The soil at this plot had an argillic horizon in the subsoil, but averaged less than 35 percent clay in the upper part. The upper subsoil consisted of loam, which is typically not observed in Braddock soils. Manganese concentrations were observed as shallow as 24 centimeters and continued throughout the profile. Since clay contents were lower than expected in Braddock, this soil is a taxadjunct to the series.

Plot BLAN_017 was located in an Udults-Udalfs association map unit. This map unit consists of steeper slopes with a greater variability of soils than most other map units in Clarke County. Consequently, a mapunit association was used with the major components identified above series level (Udults and Udalfs). The plot was on a 13% slope within the middle or upper portions of the hillslope. The parent material was old alluvium over residuum with a lithologic discontinuity (distinctly different parent materials than horizons above) observed at 29 cm. An argillic horizon was described from 29-100 cm. Very few rock fragments were found in the profile. The dominant vegetation at this plot was white oak, tulip poplar, hickory, and Japanese stiltgrass. The soil at this plot best fit the Braddock soils.

A soil similar to Timberville was identified at BLAN_011. Timberville soils occur in the heads of drains where water collects but no defined channel has formed. Timberville has bedrock below 1.5 meters and is formed in local alluvium (washed from cleared areas and deposited very close to source) and colluvial materials derived from limestone and other sedimentary rocks. These soils experience frequent flooding of very short duration due to heavy rain events. This series is throughout the Great Valley, which is underlain by limestone bedrock. The plot was on an 11% slope near the bottom of a hill. A change in parent materials (lithologic discontinuity) was found in the last horizon. Sandstone, gravel and cobbles were described throughout. The high rock fragment content of this soil exceeds the particle size family for the series. Since the soil interprets similar to Timberville, it is considered a taxadjunct to the Timberville series. Land cover at this plot was primarily hardwoods with paw paw, tulip poplar, and black oak dominating. Despite the forest cover, no organic horizon was described on the surface.

Webbtown soils were described at BLAN_020. This series commonly has bedrock within 1 meter. It is formed in residuum derived from shale, limestone, siltstone, and sandstone. The soil

at this plot had a paralithic (weather bedrock) contact at 80 cm. The plot was on a convex (shoulder) position with 14% slope. Rock outcrop was observed at this site and estimated to cover 0.01% of the plot. An argillic horizon was described from 10 to 80 cm. Rock fragment volume was high with an average of 43% throughout the lower horizons. It is located in pastureland with fescue, white clover, and ragweed dominating.