Depth Argillic Spreadsheet.

***Tab 1: Soil Cores***

Soil core depths ranged from 0 – 2.0 m. All soil cores were collected from 0-7.5 cm, 7.5-15 cm, 15-35 cm, 35-60 cm, 60-100 cm, 100-150 cm, 150-200cm or until the top of the argillic horizon was reached. All texture data was analyzed by Rachel Ryland. Row 2 – 66 collected by Rachel Ryland. Row 67 – 84 collected by Maryam Foroughi. Row 85 – 92 collected by Diego Barcellos.

Column A: **Watershed**

Historically farmed watersheds 3 and 4 off State Rd. S-44-16.

Bomb is considered a reference hillslope located off Bombing Range Rd near the camp ground.

Bunc is considered a reference location hillslope located off Old Buncombe Rd.

PIT (Poison Ivy Tree) is considered a reference hillslope located off State Rd. S-44-16 between watershed 1 and Rose Hill Plantation.

Column B: **Transect**

The transect number does not correlate to any transects from previous research in the Calhoun CZO. These transect number were for personal use when labeling soil core samples. Generally, transects run from ridge to ridge for watersheds 3 and 4, and along hillslopes for reference locations.

Column C: **Hole\_#**

The hole # does not correlate to any previous research in the Calhoun CZO. These numbers were for personal used when labeling soil core samples. Generally, for watershed 3 and 4 the hole number is associated with the landscape positon. #1 and 10 are ridge locations, #2 and 9 are shoulder locations, #3 and 8 mid-slope locations, # 4 and 7 are foot-slope, and #5 and 6 are Toe-slope locations. The hole # for the reference hillslopes are #1 for upland, #2 for mid-slope, and #3 for lowland.

Column D: **Lon.**

Easting

Column E: **Lat.**

Northing

Column F: **Slope (percent)**

Percent slope was extracted from DEM files created from the Calhoun Experimental Forest – 2016 Leaf off LiDAR survey downloaded from OpenTopography. Percent slope for the Bunc reference hillslope was extracted from an older LiDAR survey, as the area was not included in the 2016 survey.

Column G: **Aspect (degree)**

The aspect (direction the slope faces) measured clockwise in degrees, with 0 and 360 degrees being due north. Aspect was extracted from DEM files created from the Calhoun Experimental Forest – 2016 Leaf off LiDAR survey downloaded from OpenTopography. Aspect for the Bunc reference hillslope was extracted from an older LiDAR survey, as the area was not included in the 2016 survey.

Column H: **Deepest\_TPP\_Depth(centimeter)**

The first method used to determine the depth to the argillic layer was the tile push probe (TPP). The TPP was pressed into the ground with 3 to 5 replications before soil coring. The deepest depth (recorded in centimeters) of the TPP was consider the depth to the top of the argillic horizon.

Column I: **Depth\_Bt\_FN (centimeter)**

The second method to determine the depth to the argillic (Bt) horizon was soil coring. Soil core depths ranged from 0 - 2 m. All soil cores were collected from 0-7.5 cm, 7.5-15 c, 15-30 cm, 30-60 cm, 60-100 cm, 100-150 cm, 150-200cm or until the top of the argillic horizon was reached. The depths were measured in centimeters. FN is short for Field Notes.

Column J: **Depth\_Bt\_PS (centimeter)**

Range in depth of the soil core sample where the argillic horizon begins as determined by particle size analysis. The soil core samples, collected at depths listed above, were tested for particle size distribution (PS) using the Gee and Or (2002) hydrometer method. Soil samples were air dried and passed through a 2mm sieve. Sieved samples were then mixed with a sodium hexametaphosphate solution and were shaken for 12 hours. There was no pretreatment used for organic matter or iron oxide removal.

Column K: **Landscape\_Position**

Each soil core was collected at 1of 5 landscape positions. Landscapes position definition were modified from Park and van de Giesen (2004).

Ridge - flat, upland surface, no slope

Shoulder – convex upland surface

Mid-slope – straight middle slope segment

Foot-slope – convex lowland surface

Toe-slope – flat, lowland surface

Columns L - AF: **Clay(%)\_0-7.5(cm), Silt(%)\_150-200(cm) (percent)**

Percent clay, sand and silt (see column J for method) found at each depth (see column I for depths) within the soil core sample.

Columns AG - AJ: **EMI(1\_1) – EMI(2\_2) (mS/m)**

A DUALEM-21S Electromagnetic Induction (EMI) device was used to measure the electrical conductivity (mS/m) of the soil within each watershed. The EMI was carried about 45 cm above the ground and geo-located using a Juniper System, Archer 2 GPS unit with sensor track HGIS software. There are 4 sensors at which the EMI measures: horizontal co-planer (1\_1) located at 1m, perpendicular dipole (1\_2) located at 1m, horizontal co-planer (2\_1) located at 2m, and perpendicular dipole (2\_2) located at 2m. Columns AG – AJ are not the raw conductivity measurements; these values have been adjusted to a standard 25°C and extracted from a krig surface.

The formula for temperature conversion:

(raw conductivity value) / (1 + 0.025 \* ((ambient temperature°C) – 25°C))

Column AK: **Date\_Collected\_SoilCores**

The date that the soil core was collected.

Column AL: **Date\_Collected\_EMI**

The date that the electrical conductivity (Columns AG - AJ) was collected.

***Tab 2: Tile Push Probe***

Tile push probe samples were collected along transects between soil core transects (Tab1).

Column A: **Watershed**

Historically farmed watersheds 3 and 4 off State Rd. S-44-16.

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Bunc is considered a reference location hillslope located off Old Buncombe Rd.

PIT (Poison Ivy Tree) is considered a reference hillslope located off State Rd. S-44-16 between watershed 1 and Rose Hill Plantation.

Column B: **Transect**

The transect number does not correlate to any transects from previous research in the Calhoun CZO. These transect number were for personal use when labeling soil core samples. Generally, transects run from ridge to ridge for watersheds 3 and 4, and along hillslopes for reference locations.

Column C: **Hole\_#**

The hole # does not correlate to any previous research in the Calhoun CZO. These numbers were for personal used when labeling tile push probe samples.

Column D: **Lon.**

Easting

Column E: **Lat.**

Northing

Column F: **Slope (unit percent)**

Percent slope was extracted from DEM files created from the Calhoun Experimental Forest – 2016 Leaf off LiDAR survey downloaded from OpenTopography. Percent slope for the Bunc reference hillslope was extracted from an older LiDAR survey, as the area was not included in the 2016 survey.

Column G: **Aspect (unit degree)**

The aspect (direction the slope faces) measured clockwise in degrees, with 0 and 360 degrees being due north. Aspect was extracted from DEM files created from the Calhoun Experimental Forest – 2016 Leaf off LiDAR survey downloaded from OpenTopography. Aspect for the Bunc reference hillslope was extracted from an older LiDAR survey, as the area was not included in the 2016 survey.

Column H: **Depth\_TPP(cm)**

The tile push probe (TPP) was pressed into the ground with 3 to 5 replications. The deepest depth (recorded in centimeters) of the TPP was consider the depth to the top of the argillic horizon.

Column I: **Landscape\_Position**

Each soil core was collected at 1of 5 landscape positions. Landscapes position definition were modified from Park and van de Giesen (2004).

Ridge - flat, upland surface, no slope

Shoulder – convex upland surface

Mid-slope – straight middle slope segment

Foot-slope – convex lowland surface

Toe-slope – flat, lowland surface

Column J - M: **EMI(1\_1) (unit mS/m)**

A DUALEM-21S Electromagnetic Induction (EMI) device was used to measure the electrical conductivity (mS/m) of the soil within each watershed. The EMI was carried about 45 cm above the ground and geo-located using a Juniper System, Archer 2 GPS unit. There are 4 sensors at which the EMI measures: horizontal co-planer (1\_1) located at 1m, perpendicular dipole (1\_2) located at 1m, horizontal co-planer (2\_1) located at 2m, and perpendicular dipole (2\_2) located at 2m. Columns S – V are not the raw conductivity measurements, these values have been adjusted to a standard 25°C and extracted from a Krig surface.

The formula for temperature conversion:

(raw conductivity value) / (1 + 0.025 \* ((ambient temperature°C) – 25°C))

Column N: **Date\_Collected\_SoilCores**

The date that the tile push probe depth was collected.

Column O: **Date\_Collected\_EMI**

The date that the electrical conductivity (Columns J - M) was collected.

***Tabs 3 - 12: W3 EMI 1 – PIT EMI 2***

Tabs 3 – 12 are the raw apparent electrical conductivity measurements for the watersheds mentioned in Tabs 1 and 2.

Electrical conductivity was measured on a DUALEM 21S EMI device. The EMI was held 45cm above the ground.

Watersheds mentioned in Tabs 1 and 2:

Historically farmed watersheds 3 and 4 off State Rd. S-44-16.

Bomb is considered a reference hillslope located off Bombing Range Rd near the camp ground.

Bunc is considered a reference location hillslope located off Old Buncombe Rd.

PIT (Poison Ivy Tree) is considered a reference hillslope located off State Rd. S-44-16 between watershed 1 and Rose Hill Plantation.

Column A: **DATE**

Date that the electrical conductivity was collected.

Column B: **GPS\_TIME**

A Juniper System, Archer 2 GPS unit with sensor tracking HGIS software was used to log EMI data. The GPS Time was collected internally and was not set by user.

Column C: **WGS84\_LON**

Easting

Column D: **WGS84\_LAT**

Northing

Column E: **AUX\_X0**

The Dualem 21S EMI device is 2.0m long and has four electrical conductivity sensors. Two of the sensors are located at 1.0m and two are located at 2.0m. The first two sensors, located at 1.0m, are logged as PDLM1 (Ex. W3 EMI 1) in the AUX\_X0 column. The second two sensors, located at 2.0m, are logged as PDLM2 (Ex. W3 EMI 2) in the AUX \_X0 column.

Column F: **AUX\_X1**

Star Pal, HGIS GPS Mapping Software was used to map and log EMI data. This software logged the time internally and was not set by the user.

Column G: **AUX\_X2 (mS/m)**

The apparent electrical conductivity measurement, horizontal co-planer.

Column H: **AUX\_X3 (ppt)**

The horizontal co-planer in-phase measurement for AUX\_X2.

Column I: **AUX\_X4 (mS/m)**

The apparent electrical conductivity measurement, perpendicular dipole.

Column J: **AUX\_X5 (ppt)**

The perpendicular dipole in-phase measurement for AUX\_X4.