

<i>Title:</i> TOS Site Characterization Report: Domain 08		<i>Date:</i> 12/05/2018
<i>NEON Doc. #:</i> NEON.DOC.003892	<i>Author:</i> R.Krauss	<i>Revision:</i> B

TOS SITE CHARACTERIZATION REPORT: DOMAIN 08

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See configuration management system for approval history.

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CHANGE RECORD

REVISION	DATE	ECO#	DESCRIPTION OF CHANGE
A	03/09/2017	ECO-04404	Initial Release
B	12/05/2018	ECO-05647	<ul style="list-style-type: none"> • Added Phenocam images • Added Sampling Season Section • Added soil pit information table • Added percent cover of bryophyte to the plant diversity table • Updated introduction language to the site information, biomass, and plant sections

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1 DESCRIPTION

1.1 Purpose

Domain and site-specific information collected and described here is used to inform the execution of protocols for the NEON Terrestrial Observation System (TOS), and complements the official NEON TOS data products generated from each site. In addition, the TOS spatial layout and plot allocation is described for each site within the domain.

1.2 Scope

This document includes any site specific characterization methods and the results of characterization efforts for each of the three sites in the Ozarks Complex domain. For more information about the sampling methods, reference the TOS Site Characterization Methods Document (RD[06]). The geographic coordinates for all TOS sampling locations can be found in the Reference Documents area of the NEON Data Portal and are provided with TOS data product downloads.

2 RELATED DOCUMENTS AND ACRONYMS

2.1 Applicable Documents

Applicable documents contain information that shall be applied in the current document. Examples are higher level requirements documents, standards, rules and regulations.

AD[01]	NEON.DOC.004300	EHSS Policy, Program, and Management Plan
AD[02]	NEON.DOC.050005	Field Operations Job Instruction Training Plan
AD[03]	NEON.DOC.000909	TOS Science Design for Ground Beetle Abundance and Diversity
AD[04]	NEON.DOC.000910	TOS Science Design for Mosquito Abundance, Diversity and Phenology
AD[05]	NEON.DOC.000912	TOS Science Design for Plant Diversity
AD[06]	NEON.DOC.000915	TOS Science Design for Small Mammal Abundance and Diversity
AD[07]	NEON.DOC.000914	TOS Science Design for Plant Biomass and Productivity
AD[08]	NEON.DOC.000001	NEON Observatory Design
AD[09]	NEON.DOC.014042	TOS Protocol and Procedure: Plant Diversity Sampling
AD[10]	NEON.DOC.000987	TOS Protocol and Procedure: Measurement of Vegetation Structure
AD[11]	NEON.DOC.014040	TOS Protocol and Procedure: Plant Phenology

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2.2 Reference Documents

Reference documents contain information complementing, explaining, detailing, or otherwise supporting the information included in the current document.

RD[01]	NEON.DOC.000008	NEON Acronym List
RD[02]	NEON.DOC.000243	NEON Glossary of Terms
RD[03]	NEON.DOC.000913	TOS Science Design for Spatial Sampling
RD[04]	NEON.DOC.011038	TIS Site Characterization Report
RD[05]	NEON.DOC.001370	AIS Site Characterization Report
RD[06]	NEON.DOC.003885	TOS Site Characterization Methods
RD[07]	NEON.DOC.000481	TOS Protocol and Procedure: Small Mammal Sampling
RD[08]	NEON.DOC.014041	TOS Protocol and Procedure: Breeding Landbird Abundance and Diversity
RD[09]	NEON.DOC.014042	TOS Protocol and Procedure: Plant Diversity Sampling
RD[10]	NEON.DOC.000987	TOS Protocol and Procedure: Measurement of Vegetation Structure
RD[11]	NEON.DOC.014040	TOS Protocol and Procedure: Plant Phenology
RD[12]	NEON.DOC.001709	TOS Protocol and Procedure: Bryophyte Productivity

2.3 Acronyms

Acronym	Definition
BOLD	Barcode of Life Datasystems
NLCD	National Land Cover Database

3 DOMAIN 08 OVERVIEW: OZARKS COMPLEX DOMAIN

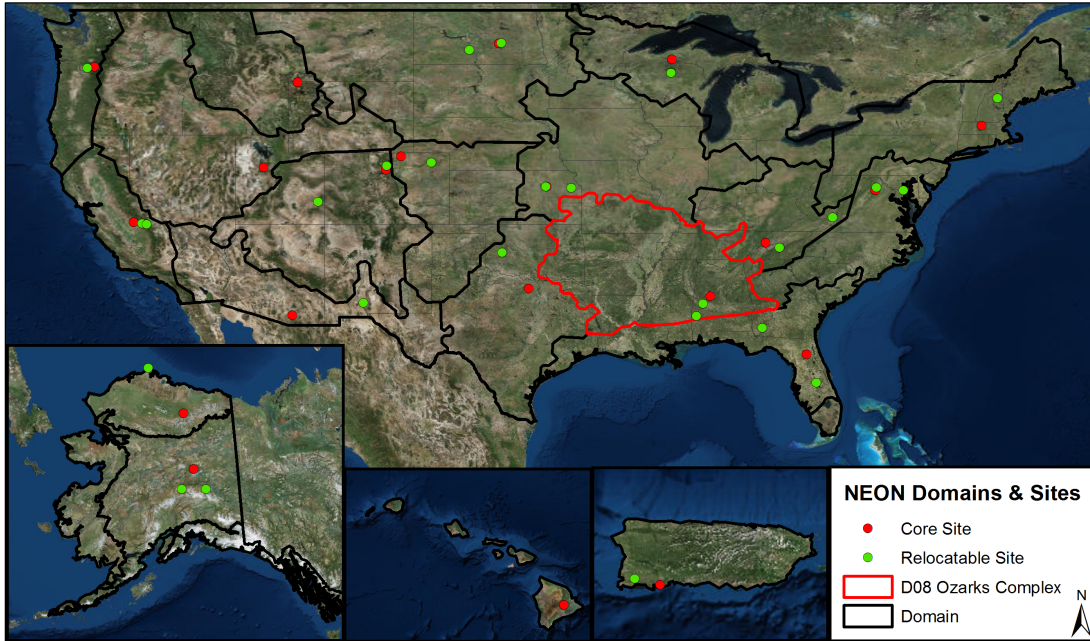


Figure 1: NEON project map with Domain 08 highlighted in red.

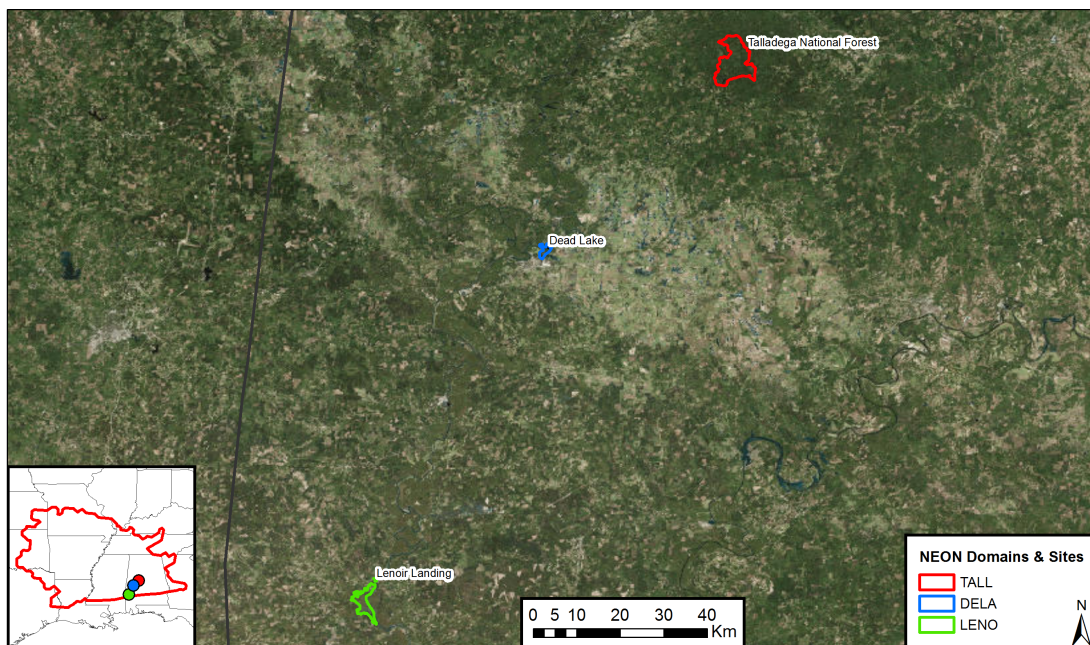


Figure 2: Site boundaries within Domain 08.

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Domain eight is a mosaic of wetlands and forests located within the Mobile River Basin which is the sixth largest basin in the country and the fourth largest in terms of stream flow (National Water Quality Assessment Program, 2013). All three TOS sites are paired with aquatic sites to allow for linkages to be studied between terrestrial and aquatic systems.

- States included in the domain: Alabama, Arkansas, Georgia, Illinois, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Oklahoma, Tennessee, Texas
- Core site: Talladega National Forest
- Relocatable 1: Dead Lake
- Relocatable 2: Lenoir Landing
- Science themes: Climate Impacts

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4 CORE SITE- TALLADEGA NATIONAL FOREST (TALL)

The Talladega National Forest site covers 53 km² within the larger Oakmulgee District of the Talladega National Forest in west-central Alabama.



Figure 3: Phenocamera image for TALL. The phenocamera is located at the top of the NEON tower and faces north. Phenocamera images are available at <https://phenocam.sr.unh.edu/webcam/network/table/>.

Key Characteristics:

- Site host: U.S. Forest Service
- Located in: Hale and Bibb counties, Alabama
- Sampling Area: 53 km²
- Plot Elevation: 60-180 m
- Dominant vegetation type: Talladega's canopy is dominated by longleaf pine (*Pinus palustris*) and loblolly pine (*Pinus taeda*). The site also includes a mixture of hardwoods and wetlands.
- General management: Management includes logging, longleaf pine restoration, and restoring the natural fire regime.
- Mayfield Creek is a stream within Talladega forest. See the AIS site characterization report for more details (RD[05]).

- Plot Selection: NEON TOS Plots were allocated across the site following NEON standard criteria and avoiding existing research.

4.1 TOS Spatial Sampling Design

TOS Distributed Plots were allocated at TALL according to a spatially balanced and stratified-random design (RD[3]). The 2006 National Land Cover Database (NLCD) was selected for stratification because of the consistent and comparable data availability across the United States. TOS Tower Plots were allocated according to a spatially balanced design in and around the NEON tower airshed (RD[03]). The maps below depict the plot locations for the first year of NEON sampling. Some plot locations may change over time due to logistics, safety, and science requirements. Please visit the NEON website (<http://www.neonscience.org>) for updated plot locations at each site.

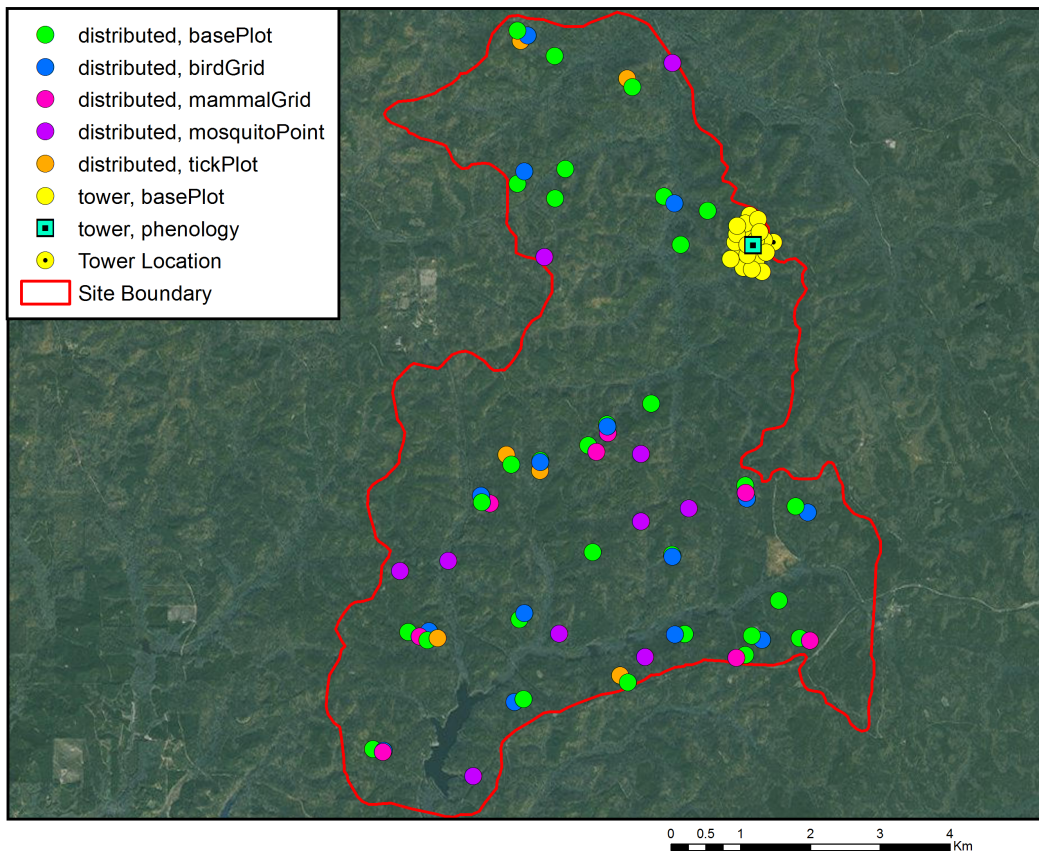


Figure 4: Map of TOS plot centroids within the NEON TOS sampling boundary at TALL.

For a list of protocols associated with each plot see tables below; for additional spatial design information see RD[03].

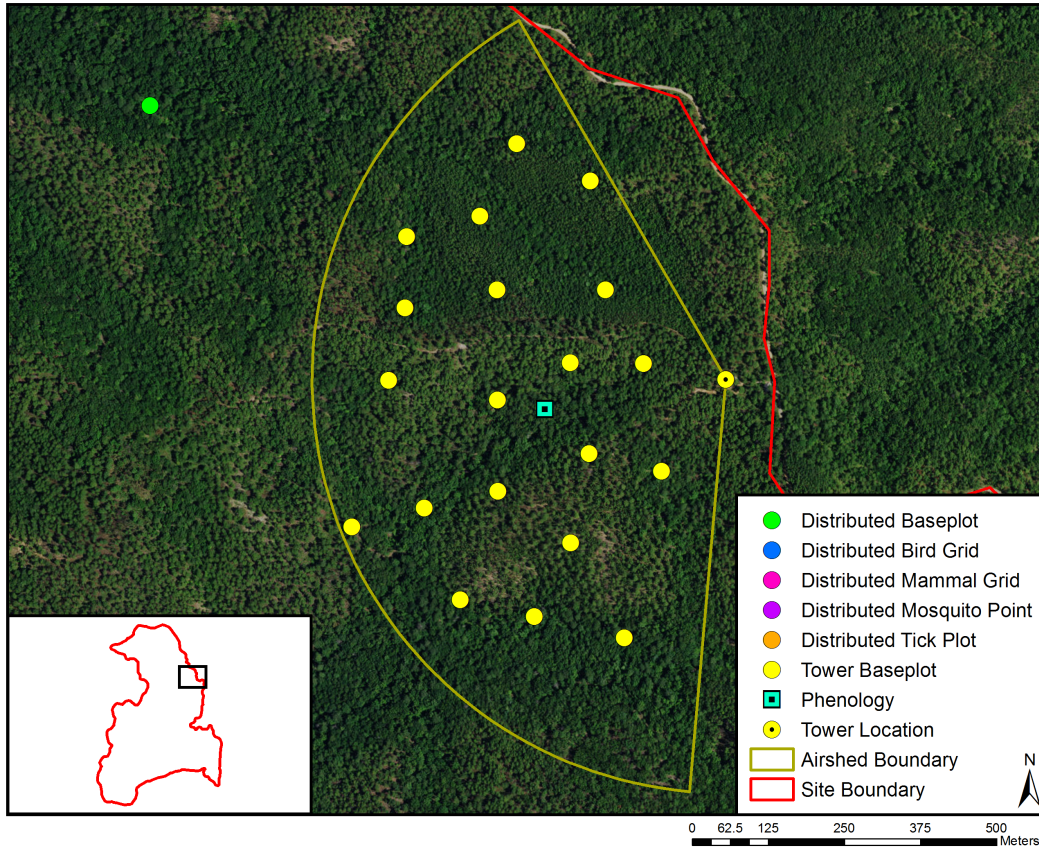


Figure 5: Map of the tower airshed and TOS plot centroids at TALL.

More information about the tower airshed can be found in the FIU site characterization report (RD[04]).

Table 1: NLCD land cover classes and area within the TOS site boundary at TALL.

NLCD Class	Site Area (km ²)	Percent (%)
Evergreen Forest	18.25	34.86
Deciduous Forest	16.61	31.74
Mixed Forest	13.8	26.37
Woody Wetlands	2.17	4.14
Open Water	0.55	1.05
Developed Open Space	0.55	1.05
Shrub Scrub	0.42	0.8

Note: Any NLCD land cover classes less than 5% will not be sampled. Additionally, no sampling will take place in Water, Developed, or Barren Land NLCD classes.

Table 2: NLCD land cover classes and TOS plot numbers at TALL.

Plot Type	Plot Subtype	NLCD Class	Number of Plots Established
Distributed	Base Plot	Deciduous Forest	10
Distributed	Base Plot	Evergreen Forest	10
Distributed	Base Plot	Mixed Forest	10
Distributed	Bird Grid	Deciduous Forest	3
Distributed	Bird Grid	Evergreen Forest	4
Distributed	Bird Grid	Mixed Forest	3
Distributed	Mammal Grid	Deciduous Forest	3
Distributed	Mammal Grid	Evergreen Forest	3
Distributed	Mammal Grid	Mixed Forest	2
Distributed	Mosquito Point	Deciduous Forest	3
Distributed	Mosquito Point	Evergreen Forest	4
Distributed	Mosquito Point	Mixed Forest	3
Distributed	Tick Plot	Deciduous Forest	2
Distributed	Tick Plot	Evergreen Forest	2
Distributed	Tick Plot	Mixed Forest	2
Tower	Base Plot	NA	20
Tower	phenology	NA	1

Note: NLCD land cover classes are not used to stratify Tower Plots. The dominant NLCD land cover types within the airshed are Evergreen Forest, Deciduous Forest, and Mixed Forest.

Table 3: Number of Distributed Base Plots per NLCD land cover class per protocol at TALL.

Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Deciduous Forest	Beetles	3
Distributed	Base Plot	Evergreen Forest	Beetles	4
Distributed	Base Plot	Mixed Forest	Beetles	3
Distributed	Base Plot	Deciduous Forest	Canopy Foliage Chemistry	3
Distributed	Base Plot	Evergreen Forest	Canopy Foliage Chemistry	4
Distributed	Base Plot	Mixed Forest	Canopy Foliage Chemistry	3
Distributed	Base Plot	Deciduous Forest	Coarse Downed Wood	7
Distributed	Base Plot	Evergreen Forest	Coarse Downed Wood	7
Distributed	Base Plot	Mixed Forest	Coarse Downed Wood	6

Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Deciduous Forest	Digital Hemispherical Photos for Leaf Area Index	7
Distributed	Base Plot	Evergreen Forest	Digital Hemispherical Photos for Leaf Area Index	7
Distributed	Base Plot	Mixed Forest	Digital Hemispherical Photos for Leaf Area Index	6
Distributed	Base Plot	Deciduous Forest	Herbaceous Biomass	7
Distributed	Base Plot	Evergreen Forest	Herbaceous Biomass	7
Distributed	Base Plot	Mixed Forest	Herbaceous Biomass	6
Distributed	Base Plot	Deciduous Forest	Plant Diversity	10
Distributed	Base Plot	Evergreen Forest	Plant Diversity	10
Distributed	Base Plot	Mixed Forest	Plant Diversity	10
Distributed	Base Plot	Deciduous Forest	Soil Biogeochemistry	2
Distributed	Base Plot	Evergreen Forest	Soil Biogeochemistry	2
Distributed	Base Plot	Mixed Forest	Soil Biogeochemistry	2
Distributed	Base Plot	Deciduous Forest	Soil Microbes	2
Distributed	Base Plot	Evergreen Forest	Soil Microbes	2
Distributed	Base Plot	Mixed Forest	Soil Microbes	2
Distributed	Base Plot	Deciduous Forest	Vegetation Structure	7
Distributed	Base Plot	Evergreen Forest	Vegetation Structure	7
Distributed	Base Plot	Mixed Forest	Vegetation Structure	6

Note: Distributed Base Plots typically support more than one TOS protocol; 'Number of Plots' cannot be added to get total TOS Distributed Base Plot number.

Table 4: Number of Tower Plots per protocol at TALL.

Plot Type	Plot Subtype	Protocols	Number of Plots
Tower	Base Plot	Canopy Foliage Chemistry	4
Tower	Base Plot	Coarse Downed Wood	20
Tower	Base Plot	Digital Hemispherical Photos for Leaf Area Index	3
Tower	Base Plot	Herbaceous Biomass	20
Tower	Base Plot	Litterfall and Fine Woody Debris	20
Tower	Base Plot	Plant Belowground Biomass	20
Tower	Base Plot	Plant Diversity	3
Tower	Base Plot	Soil Biogeochemistry	4

Plot Type	Plot Subtype	Protocols	Number of Plots
Tower	Base Plot	Soil Microbes	4
Tower	Base Plot	Vegetation Structure	20
Tower	Phenology	Plant Phenology	1

Note: Tower Base Plots typically support more than one TOS protocol; ‘Number of Plots’ cannot be added to get the total TOS Tower Base Plot number.

4.2 Sampling Season Characterization: TALL

For numerous TOS protocols, the length of the sampling season, the number of bouts, and when those bouts occur is dictated by the seasonal status of the plant community. By monitoring ‘greenness’ on a 16 day interval, the MODIS/Terra EVI phenology product provides consistent, reliable insight into plant community phenology and intensity at the continental scale. For those protocols for which timing is standardized by greenness transitions and/or peak green status, NEON has utilized these data as the primary means of guiding temporal aspects of TOS sampling at each site.

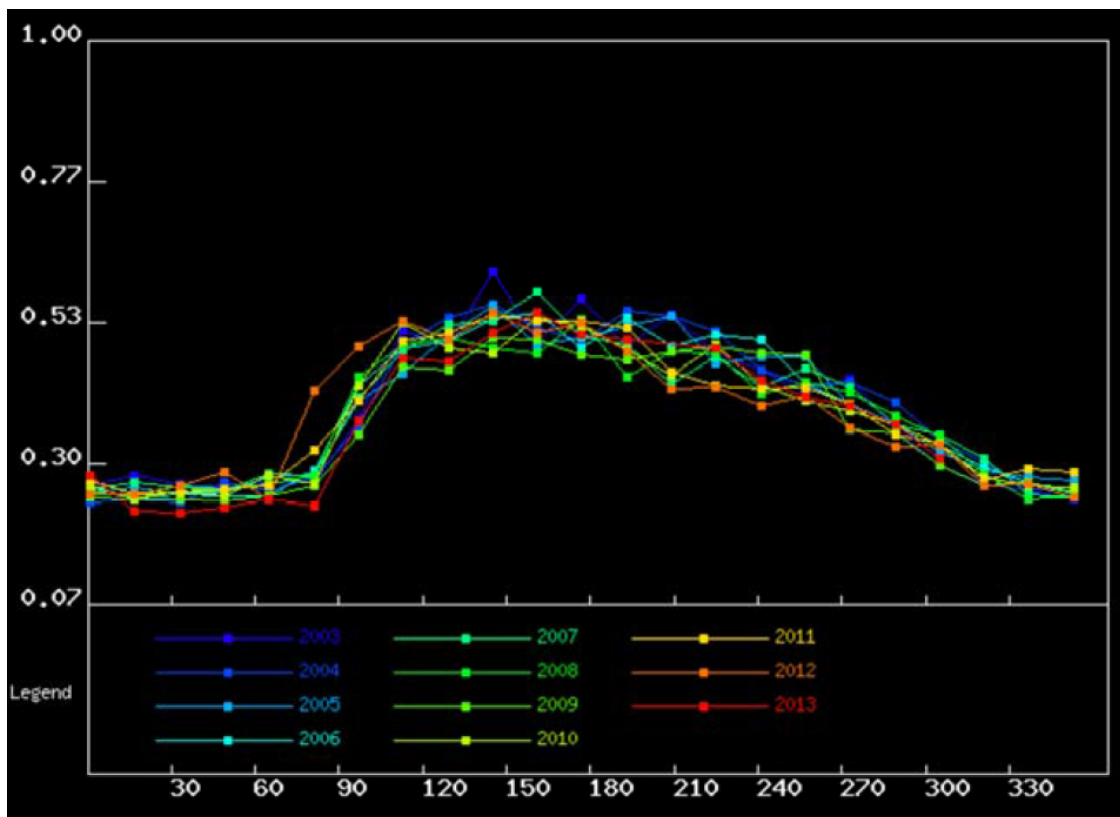


Figure 6: MODIS-EVI greenness (y-axis = EVI ratio) as a function of time (x-axis = DOY) for the years 2003-2013 at the NEON TALL site.

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Table 5: Average MODIS-EVI greenness dates for the NEON TALL site, based on data from 2003-2013 (DOY, with MM/DD in parentheses).

Average Increase	Average Maximum	Average Decrease	Average Minimum
75 (03/17)	135 (05/16)	195 (07/15)	330 (11/27)

MODIS Product Details

- Product: MODIS-EVI phenology product, 16 day interval, 250 m grid, data included from all pixels with acceptable quality within user-defined square that roughly overlaps the TOS site boundary.
- Date range: 2003-2013
- User selected area: 18.25 km x 18.25 km box, Centroid Latitude: 32.950625, Longitude: -87.393144 (WGS84 datum)

4.3 Belowground Biomass

4.3.1 Site-Specific Methods

Belowground biomass characterization data were collected down to a depth of 200 cm by NEON staff in January 2014. Since the NEON protocol for long-term, operational sampling of belowground biomass only collects data to a depth of 30 cm, the belowground biomass site characterization data are critical for scaling belowground biomass measurements to greater depths; see the TOS Science Design for Plant Biomass, Productivity, and Leaf Area Index (AD[7]) for more information. Samples were collected following the standard methods outlined in TOS Site Characterization Methods (RD[6]). Roots were sorted to two diameter size categories (≤ 2 mm and 2-30 mm) and by root status (live or dead). The tables below summarize all the belowground biomass less than or equal to 30 mm diameter; size class data and more information can be found by searching the NEON data portal for the data product numbers in Appendix A.

4.3.2 Results

Table 6: Soil Pit Information at TALL.

Latitude	Longitude	Soil Family	Soil Order
32.95106	-87.3941	Fine-loamy - siliceous - subactive - thermic Typic Hapludults	Ultisol

Soil Profile was described by Natural Resource Conservation Service (NRCS).

Table 7: Fine root mass per depth increment (cm) at TALL.

Upper Depth	Lower Depth	Mean (mg per cm ³)	Std Dev
0	10	2.85	0.57
10	20	1.4	0.51
20	30	2.53	2.29
30	40	3.05	3.27
40	50	1.61	0.91
50	60	0.57	0.18
60	70	0.23	0.12
70	80	0.04	0.03
80	90	0.08	0.08
90	100	0.08	0.06
100	120	0.02	0.02
120	140	0	0
140	160	0.02	0.03
160	180	0	0
180	200	0	0

Table 8: Cumulative fine root mass as a function of depth (cm) at TALL.

Upper Depth	Lower Depth	Mean Cumulative (g per m ²)	Cumulative Std Dev
0	10	285.09	57.04
10	20	425.4	107.68
20	30	678.12	257.45
30	40	983.01	535.07
40	50	1143.97	624.15
50	60	1200.74	638.22
60	70	1223.3	627.14
70	80	1227.7	624.43
80	90	1236	618.82
90	100	1244.3	622.06
100	120	1247.93	622.33
120	140	1248.62	621.9
140	160	1252.51	620.02
160	180	1252.86	620.14

Upper Depth	Lower Depth	Mean Cumulative (g per m ²)	Cumulative Std Dev
180	200	1252.98	620.26

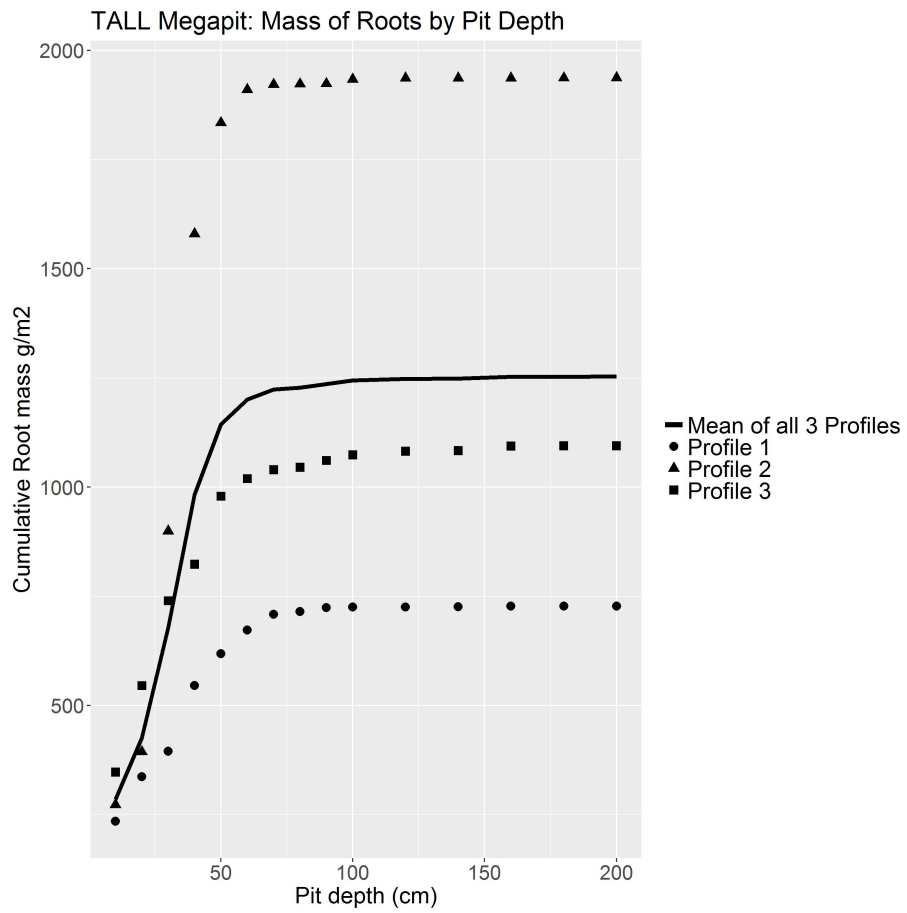


Figure 7: Cumulative root mass by pit depth at TALL.

Table 9: Fine root biomass sampling summary data at TALL.

Total Pit Depth (cm)	200
Total Mean Cumulative Mass at 30cm (g per m ²)	678.12
Total Mean Cumulative Mass at 100cm (g per m ²)	1244.30
Total Mean Cumulative Mass (g per m ²)	1252.98

4.4 Plant Characterization and Phenology Species Selection

4.4.1 Site-Specific Methods

Plant characterization data were collected by an external contractor during September of 2013. Plant characterization data informs sampling procedures for plant phenology and plant productivity protocols.

The overall ranking (“Rank” in the table below) was calculated based on three separate measurements. Overall ranking weights are influenced by the number of species within each grouping.

1. Mean percent cover values were calculated based on species specific cover estimation for all plant species under 3m tall in eight 1m by 1m subplots per plot; see the TOS Protocol and Procedure: Plant Diversity Sampling (RD[09]) for more information.
2. Mean canopy area values were calculated based on all species specific shrub canopy diameter measurements within the entire plot or subplot; see the TOS Protocol and Procedure: Measurement of Vegetation Structure (RD[10]) for more information.
3. Mean ABH (area at breast height) measurements were calculated based on diameter at breast height measurements for all woody vegetation with a diameter greater than 1cm at 130cm height within the entire plot or subplot; see the TOS Protocol and Procedure: Measurement of Vegetation Structure (RD[10]) for more information.

The standard field methods and ranking calculations are further outlined in TOS Site Characterization Methods (RD[6]). For more information on this protocol and data product numbers see Appendix A. ###Results

Table 10: Site plant characterization and phenology species summary at TALL.

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
VAAR	<i>Vaccinium arboreum</i> Marshall	1	12	NA	NA
LIST2	<i>Liquidambar styraciflua</i> L.	10	3	NA	1.15
AGTE3	<i>Agalinis tenuifolia</i> (Vahl) Raf.	100	<1	NA	NA
ARSE3	<i>Aristolochia serpentaria</i> L.	100	<1	NA	NA
BOBI	<i>Botrychium biternatum</i> (Sav.) Underw.	100	<1	NA	NA
CNURS	<i>Cnidocolus urens</i> (L.) Arthur var. <i>stimulosus</i> (Michx.) Govaerts	100	<1	NA	NA
DEVI4	<i>Desmodium viridiflorum</i> (L.) DC.	100	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
DIAC2	<i>Dichanthelium acuminatum</i> (Sw.) Gould & C.A. Clark	100	<1	NA	NA
EUAL2	<i>Eupatorium album</i> L.	100	<1	NA	NA
EUPAT	<i>Eupatorium</i> sp.	100	<1	NA	NA
HEDI2	<i>Helianthus divaricatus</i> L.	100	<1	NA	NA
LERE2	<i>Lespedeza repens</i> (L.) W.P.C. Barton	100	<1	NA	NA
PALA10	<i>Paspalum laeve</i> Michx.	100	<1	NA	NA
SMSM	<i>Smilax smalli</i> Morong	100	<1	NA	NA
SOCA4	<i>Solidago caesia</i> L.	100	<1	NA	NA
STBI2	<i>Stylosanthes biflora</i> (L.) Britton, Sterns & Poggenb.	100	<1	NA	NA
STHU2	<i>Stylisma humistrata</i> (Walter) Chapm.	100	<1	NA	NA
SYPA11	<i>Symphotrichum patens</i> (Aiton) G.L. Nesom	100	<1	NA	NA
TRUR2	<i>Tragia urticifolia</i> Michx.	100	<1	NA	NA
VEAN	<i>Vernonia angustifolia</i> Michx.	100	<1	NA	NA
VINU	<i>Viburnum nudum</i> L.	100	<1	NA	NA
PTAQ	<i>Pteridium aquilinum</i> (L.) Kuhn	11	4	NA	NA
ARAT	<i>Arnoglossum atriplicifolium</i> (L.) H. Rob.	119	<1	NA	NA
ATFI	<i>Athyrium filix-femina</i> (L.) Roth	119	<1	NA	NA
CAREX	<i>Carex</i> sp.	119	<1	NA	NA
CHVI3	<i>Chionanthus virginicus</i> L.	119	<1	NA	NA
CRSA4	<i>Crotalaria sagittalis</i> L.	119	<1	NA	NA
DEPA6	<i>Desmodium paniculatum</i> (L.) DC.	119	<1	NA	NA
DEPE80	<i>Desmodium perplexum</i> B.G. Schub.	119	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
DIOV	<i>Dichantheium ovale</i> (Elliott) Gould & C.A. Clark	119	<1	NA	NA
DIVI4	<i>Dioscorea villosa</i> L.	119	<1	NA	NA
EURO4	<i>Eupatorium rotundifolium</i> L.	119	<1	NA	NA
GARE2	<i>Galactia regularis</i> (L.) Britton, Sterns & Poggenb.	119	<1	NA	NA
GEVI5	<i>Gentiana villosa</i> L.	119	<1	NA	NA
HEAR6	<i>Hexastylis arifolia</i> (Michx.) Small	119	<1	NA	NA
HEMI3	<i>Helianthus microcephalus</i> Torr. & A. Gray	119	<1	NA	NA
HYQU3	<i>Hydrangea quercifolia</i> W. Bartram	119	<1	NA	NA
LIVI	<i>Linum virginianum</i> L.	119	<1	NA	NA
POBI2	<i>Polygonatum</i> <i>biflorum</i> (Walter) Elliott	119	<1	NA	NA
MOCA7	<i>Morella caroliniensis</i> (Mill.) Small	119	<1	NA	NA
OXDI2	<i>Oxalis dillenii</i> Jacq.	119	<1	NA	NA
PHPY4	<i>Photinia pyrifolia</i> (Lam.) K.R. Robertson & Phipps	119	<1	NA	NA
PIGR4	<i>Pityopsis graminifolia</i> (Michx.) Nutt.	119	<1	NA	NA
RUCA4	<i>Ruellia caroliniensis</i> (J.F. Gmel.) Steud.	119	<1	NA	NA
SCCI	<i>Scleria ciliata</i> Michx.	119	<1	NA	NA
SYLA4	<i>Symphyotrichum</i> <i>lateriflorum</i> (L.) Á. Löve & D. Löve	119	<1	NA	NA
SYUN	<i>Symphyotrichum</i> <i>undulatum</i> (L.) G.L. Nesom	119	<1	NA	NA
TOPU2	<i>Toxicodendron pubescens</i> Mill.	119	<1	NA	NA
SCSC	<i>Schizachyrium scoparium</i> (Michx.) Nash	12	3	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
QUAL	<i>Quercus alba</i> L.	13	<1	NA	1.33
QUFA	<i>Quercus falcata</i> Michx.	14	<1	NA	1.1
RHGL	<i>Rhus glabra</i> L.	145	<1	NA	NA
ACRU	<i>Acer rubrum</i> L.	15	1	NA	0.16
LITU	<i>Liriodendron tulipifera</i> L.	16	<1	NA	1.5
QUVE	<i>Quercus velutina</i> Lam.	17	<1	NA	0.33
NYSY	<i>Nyssa sylvatica</i> Marshall	18	<1	NA	1.24
QUNI	<i>Quercus nigra</i> L.	19	<1	NA	0.21
PIPA2	<i>Pinus palustris</i> Mill.	2	4	NA	8.31
CAGL8	<i>Carya glabra</i> (Mill.) Sweet	20	<1	NA	NA
DIFR6	<i>Ditrysinia fruticosa</i> (W. Bartram) Govaerts & Frodin	21	<1	NA	NA
POAC4	<i>Polystichum acrostichoides</i> (Michx.) Schott	22	<1	NA	NA
QUCO2	<i>Quercus coccinea</i> Münchh.	23	<1	NA	0.41
SYTI	<i>Symplocos tinctoria</i> (L.) L'Hér.	24	<1	NA	NA
OSCI	<i>Osmunda cinnamomea</i> L.	25	<1	NA	NA
QUMA6	<i>Quercus margarettae</i> (Ashe) Small	26	<1	NA	NA
SMRO	<i>Smilax rotundifolia</i> L.	27	<1	NA	NA
CAAL27	<i>Carya tomentosa</i> (Lam.) Nutt.	28	<1	NA	0.11
HAVI4	<i>Hamamelis virginiana</i> L.	29	<1	NA	NA
ARGI	<i>Arundinaria gigantea</i> (Walter) Muhl.	3	8	NA	NA
DIVI5	<i>Diospyros virginiana</i> L.	31	<1	NA	NA
CAAM2	<i>Callicarpa americana</i> L.	32	<1	NA	NA
QURU	<i>Quercus rubra</i> L.	33	<1	NA	NA
MAVI2	<i>Magnolia virginiana</i> L.	34	NA	NA	0.5
QUMA3	<i>Quercus marilandica</i> Münchh.	35	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
CHLA6	<i>Chasmanthium laxum</i> (L.) Yates	36	<1	NA	NA
MOCE2	<i>Morella cerifera</i> (L.) Small	37	<1	NA	NA
VAST	<i>Vaccinium stamineum</i> L.	38	<1	NA	NA
DIBO2	<i>Dichantherium boscii</i> (Poir.) Gould & C.A. Clark	39	<1	NA	NA
PITA	<i>Pinus taeda</i> L.	4	1	NA	6.31
CHSE2	<i>Chasmanthium sessiliflorum</i> (Poir.) Yates	40	<1	NA	NA
DICO2	<i>Dichantherium commutatum</i> (Schult.) Gould	40	<1	NA	NA
CAPA24	<i>Carya pallida</i> (Ashe) Engl. & Graebn.	42	<1	NA	0.02
TEVI	<i>Tephrosia virginiana</i> (L.) Pers.	43	<1	NA	NA
VAEL	<i>Vaccinium elliotii</i> Chapm.	44	<1	NA	NA
SAAL5	<i>Sassafras albidum</i> (Nutt.) Nees	45	<1	NA	NA
QUST	<i>Quercus stellata</i> Wangenh.	46	<1	NA	0.16
SMGL	<i>Smilax glauca</i> Walter	47	<1	NA	NA
AEPA	<i>Aesculus pavia</i> L.	48	<1	NA	NA
WOAR	<i>Woodwardia areolata</i> (L.) T. Moore	49	<1	NA	NA
GESE	<i>Gelsemium sempervirens</i> (L.) W.T. Aiton	5	6	NA	NA
VAPA4	<i>Vaccinium pallidum</i> Aiton	50	<1	NA	NA
SAAL21	<i>Saccharum alopecuroides</i> (L.) Nutt.	51	<1	NA	NA
SYDU2	<i>Symphotrichum dumosum</i> (L.) G.L. Nesom	51	<1	NA	NA
ASPA18	<i>Asimina parviflora</i> (Michx.) Dunal	53	<1	NA	NA
VAFU	<i>Vaccinium fuscatum</i> Aiton	54	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
CLMA4	<i>Clitoria mariana</i> L.	56	<1	NA	NA
DILA9	<i>Dichanthelium laxiflorum</i> (Lam.) Gould	56	<1	NA	NA
PIEC2	<i>Pinus echinata</i> Mill.	58	NA	NA	0.17
SMBO2	<i>Smilax bona-nox</i> L.	59	<1	NA	NA
OXAR	<i>Oxydendrum arboreum</i> (L.) DC.	6	6	NA	0.22
RUFL	<i>Rubus flagellaris</i> Willd.	60	<1	NA	NA
SOAR	<i>Solidago arguta</i> Aiton	60	<1	NA	NA
ITVI	<i>Itea virginica</i> L.	62	<1	NA	NA
EUPU7	<i>Euphorbia pubentissima</i> Michx.	63	<1	NA	NA
MIRE	<i>Mitchella repens</i> L.	63	<1	NA	NA
COMA6	<i>Coreopsis major</i> Walter	65	<1	NA	NA
CANI3	<i>Carex nigromarginata</i> Schwein.	66	<1	NA	NA
HADI3	<i>Halesia diptera</i> Ellis	67	<1	NA	NA
ILOP	<i>Ilex opaca</i> Aiton	68	<1	NA	0.03
VIRO3	<i>Vitis rotundifolia</i> Michx.	7	6	NA	NA
RHCA7	<i>Rhododendron canescens</i> (Michx.) Sweet	70	<1	NA	NA
SEPE2	<i>Seymeria pectinata</i> Pursh	71	<1	NA	NA
CAOD3	<i>Carphephorus</i> <i>odoratissimus</i> (J.F. Gmel.) Herb.	72	<1	NA	NA
SCINA	<i>Scutellaria incana</i> Biehler var. <i>australis</i> (Epling) Collins, ined.	73	<1	NA	NA
TORA2	<i>Toxicodendron radicans</i> (L.) Kuntze	74	<1	NA	NA
HYHY	<i>Hypericum hypericoides</i> (L.) Crantz	75	<1	NA	NA
ELTO2	<i>Elephantopus tomentosus</i> L.	76	<1	NA	NA
SOOD	<i>Solidago odora</i> Aiton	76	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
CAGL5	<i>Carex glaucescens</i> Elliott	78	<1	NA	NA
SETO7	<i>Sericocarpus tortifolius</i> (Michx.) Nees	78	<1	NA	NA
RHCO	<i>Rhus copallinum</i> L.	8	5	NA	NA
BESC	<i>Berchemia scandens</i> (Hill) K. Koch	80	<1	NA	NA
DEBA4	<i>Decumaria barbara</i> L.	80	<1	NA	NA
DECI	<i>Desmodium ciliare</i> (Muhl. ex Willd.) DC.	80	<1	NA	NA
TRSM	<i>Tragia smallii</i> Shinnars	80	<1	NA	NA
DIDI6	<i>Dichantherium dichotomum</i> (L.) Gould	84	<1	NA	NA
TRUR	<i>Tragia urens</i> L.	84	<1	NA	NA
AGAR4	<i>Ageratina aromatica</i> (L.) Spach	86	<1	NA	NA
AUPE	<i>Aureolaria pectinata</i> (Nutt.) Pennell	86	<1	NA	NA
CEVI2	<i>Centrosema virginianum</i> (L.) Benth.	86	<1	NA	NA
GADU	<i>Gaylussacia dumosa</i> (Andrews) Torr. & A. Gray	86	<1	NA	NA
GAPI2	<i>Galium pilosum</i> Aiton	86	<1	NA	NA
GYAM	<i>Gymnopogon ambiguus</i> (Michx.) Britton, Sterns & Poggenb.	86	<1	NA	NA
HIGR3	<i>Hieracium gronovii</i> L.	86	<1	NA	NA
IPPA	<i>Ipomoea pandurata</i> (L.) G. Mey.	86	<1	NA	NA
PAQU2	<i>Parthenocissus quinquefolia</i> (L.) Planch.	86	<1	NA	NA
PRENA	<i>Prenanthes</i> sp.	86	<1	NA	NA
SILY	<i>Sideroxylon lycioides</i> L.	86	<1	NA	NA
VIAE	<i>Vitis aestivalis</i> Michx.	86	<1	NA	NA
YUFI	<i>Yucca filamentosa</i> L.	86	<1	NA	NA
COFL2	<i>Cornus florida</i> L.	9	4	NA	0.11

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
JUVI	<i>Juniperus virginiana</i> L.	99	NA	NA	0.02

Note: Taxon IDs and scientific names are based on the USDA Plants database (plants.usda.gov). Plants identified as *Quercus velutina* are likely immature *Q. falcate*. Plants identified as *Tragia smallii* or *T. urens* are most likely *T. urticifolia*. Plants identified *Centrosema virginiana* are most likely *Clitoria mariana*.

Table 11: Per plot breakdown of species richness, diversity, and herbaceous cover at TALL.

Plot ID	Species Richness	Shannon Diversity Index	Percent Total Herbaceous Cover
230445	15	1.94	54
6445	22	2.51	73
TALL_042	22	2.03	88
TALL_043	20	2.53	60
TALL_044	15	2.28	76
TALL_045	32	2.5	142
TALL_046	24	2.31	65
TALL_047	34	2.98	116
TALL_048	17	2.44	71
TALL_049	21	2.04	99
TALL_050	12	2.06	47
TALL_051	30	2.56	137
TALL_052	18	2.16	74
TALL_053	9	1.55	35
TALL_054	19	2.34	61
TALL_055	25	2.76	67
TALL_056	16	1.85	110
TALL_057	18	2.49	52
TALL_058	24	2.7	76
TALL_059	14	2.28	42

Note: Percent herbaceous cover was measured by species and then added together to calculate the percent total herbaceous cover for each plot. Plots 230445 and 6445 are no longer being sampled and were not assigned a TALL plot ID.

Bryophyte percent cover data were used to determine which sites qualify for implementation of the Bryophyte

Productivity protocol. However, bryophyte productivity sampling was discontinued in 2018 and NEON no longer implements this protocol. No bryophyte cover was recorded in TALL Tower Base Plots.

4.5 Beetles

4.5.1 Site-Specific Methods

Beetle site characterization was conducted in June 2013 by NEON staff following the standard methods outlined in TOS Site Characterization Methods (RD[6]). Beetle site characterization data were collected to start site level teaching collections. All samples were pooled before being sent for identification. For DNA sequence data generated as a result of these efforts, visit the Barcode of Life Datasystems (BOLD) at <http://www.boldsystems.org>. For more information on this protocol and data product numbers see Appendix A.

4.5.2 Results

Table 12: Beetle identification results at TALL.

Sample ID	Scientific Name
NEONcarabid8166	<i>Semiardistomis puncticollis</i>
NEONTcarabid8161	<i>Semiardistomis puncticollis</i>
NEONTcarabid8162	<i>Semiardistomis puncticollis</i>
NEONTcarabid8160	<i>Semiardistomis puncticollis</i>
NEONTcarabid8164	<i>Semiardistomis puncticollis</i>
NEONTcarabid8159	<i>Semiardistomis puncticollis</i>
NEONcarabid8165	<i>Semiardistomis puncticollis</i>
NEONTcarabid8158	<i>Semiardistomis puncticollis</i>
NEONTcarabid8147	Carabidae
NEONTcarabid8150	Carabidae
NEONTcarabid8148	Carabidae
NEONTcarabid8153	Carabidae
NEONTcarabid8157	Carabidae
NEONTcarabid8155	Carabidae
NEONTcarabid8156	Carabidae
NEONTcarabid8154	Carabidae
NEONTcarabid8163	Carabidae
NEONTcarabid8149	Carabidae
NEONTcarabid8146	Carabidae
NEONTcarabid8151	Carabidae

Sample ID	Scientific Name
NEONTcarabid8152	Carabidae
NEONTcarabid8144	Carabidae
NEONTcarabid8143	Carabidae
NEONcarabid8167	<i>Dicaelus furvus</i>
NEONTcarabid8145	<i>Anisodactylus</i> sp.

Note: Taxonomic identifications below the family level determined via genetic analysis (CO1).

4.6 Mosquitoes

4.6.1 Site-Specific Methods

Mosquito site characterization was conducted in June 2013 by NEON staff following the standard methods outlined in TOS Site Characterization Methods (RD[6]) to test protocol methods and start site level species lists. No pathogen testing was performed. All samples were pooled before being sent for identification. For more information on this protocol and data product numbers see Appendix A.

4.6.2 Results

Table 13: Mosquito identification results at TALL.

Sample ID	Scientific Name	Sex	Count
TALL.June2013.SC.1	<i>Aedes albopictus</i>	female	1
TALL.June2013.SC.1	<i>Aedes canadensis canadensis</i>	female	769
TALL.June2013.SC.1	<i>Aedes triseriatus</i>	female	16
TALL.June2013.SC.1	<i>Aedes vexans</i>	female	4
TALL.June2013.SC.1	<i>Aedes</i> spp.	female	3
TALL.June2013.SC.1	<i>Anopheles barberi</i>	female	1
TALL.June2013.SC.1	<i>Anopheles crucians</i>	female	6
TALL.June2013.SC.1	<i>Anopheles punctipennis</i>	female	4
TALL.June2013.SC.1	<i>Coquillettidia perturbans</i>	female	27
TALL.June2013.SC.1	<i>Culex erraticus</i>	female	3
TALL.June2013.SC.1	<i>Culex nigripalpus</i>	female	1
TALL.June2013.SC.1	<i>Psorophora ferox</i>	female	4

4.7 Ticks

4.7.1 Site-Specific Methods

Tick drags were conducted at TALL in June 2013 by NEON staff to test protocol methods and calculate capture rates. No pathogen testing was performed. All samples were pooled before being sent for identification. For more information on this protocol and data product numbers see Appendix A.

4.7.2 Results

Table 14: Tick identification results at TALL.

Scientific Name	Number of Adult Females	Number of Adult Males
<i>Dermacentor variabilis</i>	2	1
<i>Amblyomma maculatum</i>	1	0
<i>Ixodes scapularis</i>	1	0
<i>Amblyomma americanum</i>	63	54

4.8 Species Reference Lists

A review of the literature for taxonomic lists of interest for each site was conducted prior to field work. In the case of vertebrates that NEON may capture (e.g., reptiles, amphibians, small mammals), these lists were often required to secure permits. Key references identified in this effort are listed below. Species lists and associated references for small mammals and breeding landbirds can be found in the appendices of the respective protocols (RD[07], RD[08]).

Bousquet, Y. 2012. Catalogue of Geadephaga (Coleoptera, Adephaga) of America, north of Mexico. *ZooKeys*, (245), 1-1722.

Carter, R.E. and G. Cobb. 2012. Woody species composition following a wildfire in the Dugger Mountain Wilderness, Talladega National Forest, AL. *Journal of the Alabama Academy of Science* 83(1): 1-7. <http://www.alabamaacademyofscience.org/jcurrent.php>

Centers for Disease Control and Prevention. (2015). *Geographic distribution of ticks that bite humans*. Retrieved from http://www.cdc.gov/ticks/geographic_distribution.html

Darsie Jr., R. F., and R. A. Ward. 2005. Identification and geographical distribution of the mosquitoes of North America, North of Mexico. University Press of Florida, Gainesville.

Scott Beckett, & Golden, M. (1982). Forest Vegetation and Vascular Flora of Reed Brake Research Natural Area, Alabama. *Castanea*, 47(4), 368-392. Retrieved from <http://www.jstor.org/stable/4033029>

Smith, W. H., and L. J. Rissler. 2010. Quantifying disturbance in terrestrial communities: Abundance-biomass comparisons of herpetofauna closely track forest succession. *Restoration Ecology* 18:195-204.

<i>Title:</i> TOS Site Characterization Report: Domain 08		<i>Date:</i> 12/05/2018
<i>NEON Doc. #:</i> NEON.DOC.003892	<i>Author:</i> R.Krauss	<i>Revision:</i> B

Species Inventory List. 2008. The University of Alabama/Talladega NF Oakmulgee District, Longleaf Herpetofaunal Diversity, Talladega National Forest. <http://bama.ua.edu/~fi> regrant/

Willis, D., R. Carter, C. Murdock, and B. Blair. 2012. Relationship between habitat type, fire frequency, and *Amblyomma americanum* populations in east-central Alabama. *Journal of Vector Ecology* 37(2): 1-9. <http://onlinelibrary.wiley.com/doi/10.1111/j.1948-7134.2012.00241.x/abstract>

Title: TOS Site Characterization Report: Domain 08		Date: 12/05/2018
NEON Doc. #: NEON.DOC.003892	Author: R.Krauss	Revision: B

5 RELOCATABLE SITE 1- DEAD LAKE (DELA)

Dead Lake is a seasonally flooded hardwood bottomland located in western Alabama.

NEON.D08.DE LA.DP1.00033 - NetCam SC IR - Thu Mar 30 2017 18:00:05 UTC
Camera Temperature: 45.0
Exposure: 63



Figure 8: Phenocamera image for DELA. The phenocamera is located at the top of the NEON tower and faces north. Phenocamera images are available at <https://phenocam.sr.unh.edu/webcam/network/table/>.

Key Characteristics:

- Site host: U.S Army Corps of Engineers
- Located in: Greene County, Alabama
- Sampling Area: 4.1 km²
- Plot Elevation: 20-40m
- Dominant vegetation type: Overstory is broad mix of cypress (*Taxodium* spp.), black gum (*Nyssa sylvatica*), shagbark hickory (*Carya ovata*), oaks, and green ash (*Fraxinus pennsylvanica*). Ground cover includes bamboo, grass, smilax and sometimes large and in places, complete poison ivy (*Toxicodendrom radicans*) cover.
- General management: The Black Warrior & Tombigbee Waterway system surrounding Dead Lake serves commercial navigation purposes as well as recreational opportunities.
- The Black River Warrior aquatic site is located east of DELA. See the AIS site characterization report for more details (RD[05]).

- Plot Selection: NEON TOS Plots were allocated across the site following NEON standard criteria and avoiding existing research.

5.1 TOS Spatial Sampling Design

TOS Distributed Plots were allocated at DELA according to a spatially balanced and stratified-random design (RD[3]). The 2006 National Land Cover Database (NLCD) was selected for stratification because of the consistent and comparable data availability across the United States. TOS Tower Plots were allocated according to a spatially balanced design in and around the NEON tower airshed (RD[03]). The maps below depict the plot locations for the first year of NEON sampling. Some plot locations may change over time due to logistics, safety, and science requirements. Please visit the NEON website (<http://www.neonscience.org>) for updated plot locations at each site.

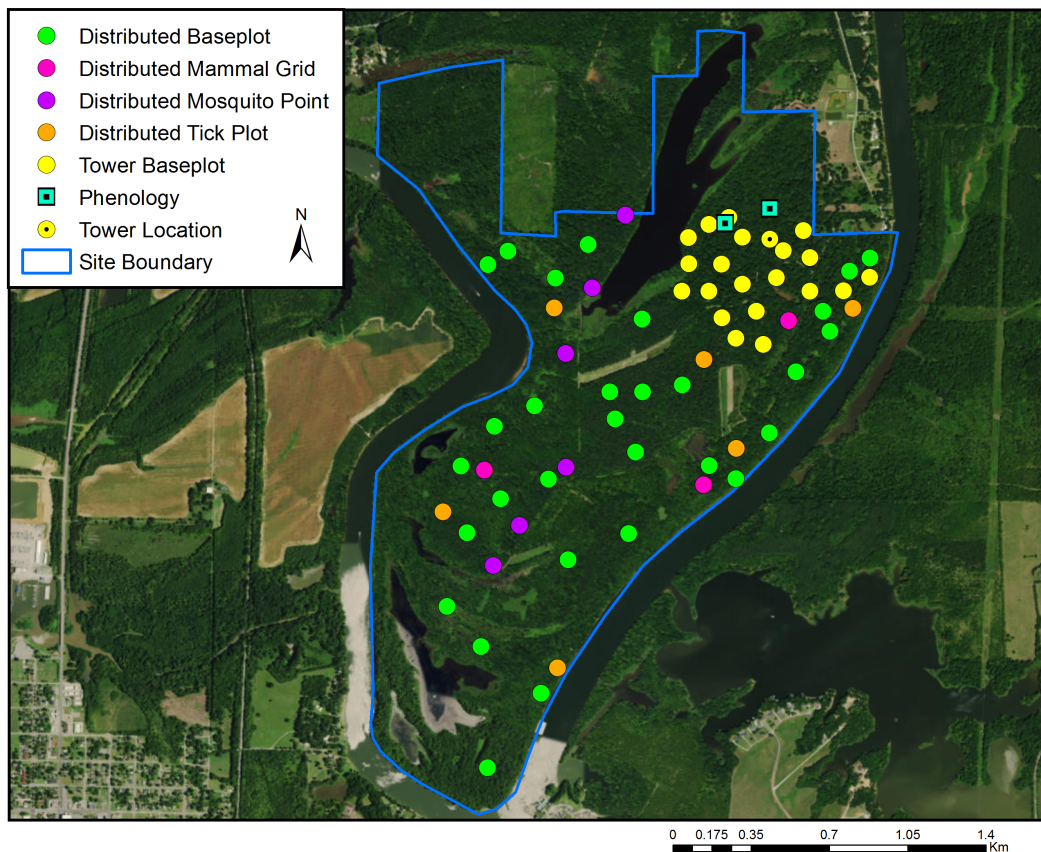


Figure 9: Map of TOS plot centroids within the NEON TOS sampling boundary at DELA.

For a list of protocols associated with each plot see tables below; for additional spatial design information see RD[03].

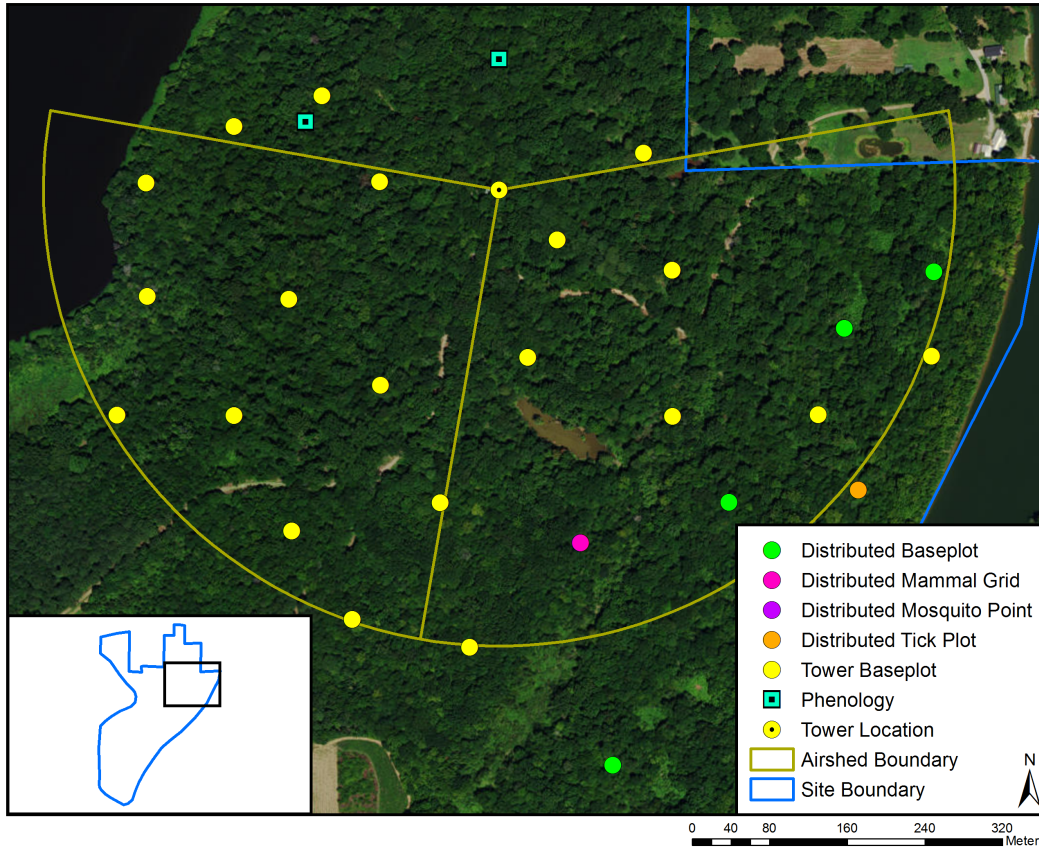


Figure 10: Map of the tower airshed and TOS plot centroids at DELA.

More information about the tower airshed can be found in the FIU site characterization report (RD[04]).

Table 15: NLCD land cover classes and area within the TOS site boundary at DELA.

NLCD Class	Site Area (km ²)	Percent (%)
Woody Wetlands	2.96	72.15
Open Water	0.57	13.95
Evergreen Forest	0.38	9.14
Deciduous Forest	0.06	1.47
Pasture Hay	0.05	1.12
Developed Open Space	0.03	0.81
Emergent Herbaceous Wetlands	0.03	0.61
Mixed Forest	0.02	0.59
Shrub Scrub	0.01	0.15

Note: Any NLCD land cover classes less than 5% will not be sampled. Additionally, no sampling will take place in Water, Developed, or Barren Land NLCD classes.

Table 16: NLCD land cover classes and TOS plot numbers at DELA.

Plot Type	Plot Subtype	NLCD Class	Number of Plots Established
Distributed	Base Plot	Evergreen Forest	8
Distributed	Base Plot	Woody Wetlands	22
Distributed	Mammal Grid	Woody Wetlands	3
Distributed	Mosquito Point	Evergreen Forest	1
Distributed	Mosquito Point	Woody Wetlands	9
Distributed	Tick Plot	Evergreen Forest	2
Distributed	Tick Plot	Woody Wetlands	4
Tower	Base Plot	NA	20
Tower	Phenology Plot	NA	2

Note: NLCD land cover classes are not used to stratify Tower Plots. The dominant NLCD land cover types within the airshed are Deciduous Forest and Woody Wetlands.

Table 17: Number of Distributed Base plots per NLCD land cover class per protocol at DELA.

Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Evergreen Forest	Beetles	1
Distributed	Base Plot	Woody Wetlands	Beetles	9
Distributed	Base Plot	Evergreen Forest	Birds	2
Distributed	Base Plot	Woody Wetlands	Birds	12
Distributed	Base Plot	Evergreen Forest	Canopy Foliage Chemistry	1
Distributed	Base Plot	Woody Wetlands	Canopy Foliage Chemistry	9
Distributed	Base Plot	Evergreen Forest	Coarse Downed Wood	2
Distributed	Base Plot	Woody Wetlands	Coarse Downed Wood	18
Distributed	Base Plot	Evergreen Forest	Digital Hemispherical Photos for Leaf Area Index	2
Distributed	Base Plot	Woody Wetlands	Digital Hemispherical Photos for Leaf Area Index	18
Distributed	Base Plot	Evergreen Forest	Herbaceous Biomass	2
Distributed	Base Plot	Woody Wetlands	Herbaceous Biomass	18
Distributed	Base Plot	Evergreen Forest	Plant Diversity	8
Distributed	Base Plot	Woody Wetlands	Plant Diversity	22

Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Evergreen Forest	Soil Biogeochemistry	1
Distributed	Base Plot	Woody Wetlands	Soil Biogeochemistry	5
Distributed	Base Plot	Evergreen Forest	Soil Microbes	1
Distributed	Base Plot	Woody Wetlands	Soil Microbes	5
Distributed	Base Plot	Evergreen Forest	Vegetation Structure	2
Distributed	Base Plot	Woody Wetlands	Vegetation Structure	18

Note: Distributed Base Plots typically support more than one TOS protocol; ‘Number of Plots’ cannot be added to get total TOS Distributed Base Plot number.

Table 18: Number of Tower Plots per protocol at DELA.

Plot Type	Plot Subtype	Protocols	Number of Plots
Tower	Base Plot	Canopy Foliage Chemistry	4
Tower	Base Plot	Coarse Downed Wood	20
Tower	Base Plot	Digital Hemispherical Photos for Leaf Area Index	3
Tower	Base Plot	Herbaceous Biomass	20
Tower	Base Plot	Litterfall and Fine Woody Debris	20
Tower	Base Plot	Plant Belowground Biomass	20
Tower	Base Plot	Plant Diversity	3
Tower	Base Plot	Soil Biogeochemistry	4
Tower	Base Plot	Soil Microbes	4
Tower	Base Plot	Vegetation Structure	20
Tower	Phenology	Plant Phenology	2

Note: Tower Base Plots typically support more than one TOS protocol; ‘Number of Plots’ cannot be added to get total TOS Tower Base Plot number.

5.2 Sampling Season Characterization: DELA

For numerous TOS protocols, the length of the sampling season, the number of bouts, and when those bouts occur is dictated by the seasonal status of the plant community. By monitoring ‘greenness’ on a 16 day interval, the MODIS/Terra EVI phenology product provides consistent, reliable insight into plant community phenology and intensity at the continental scale. For those protocols for which timing is standardized by greenness transitions and/or peak green status, NEON has utilized these data as the primary means of guiding temporal aspects of TOS sampling at each site.

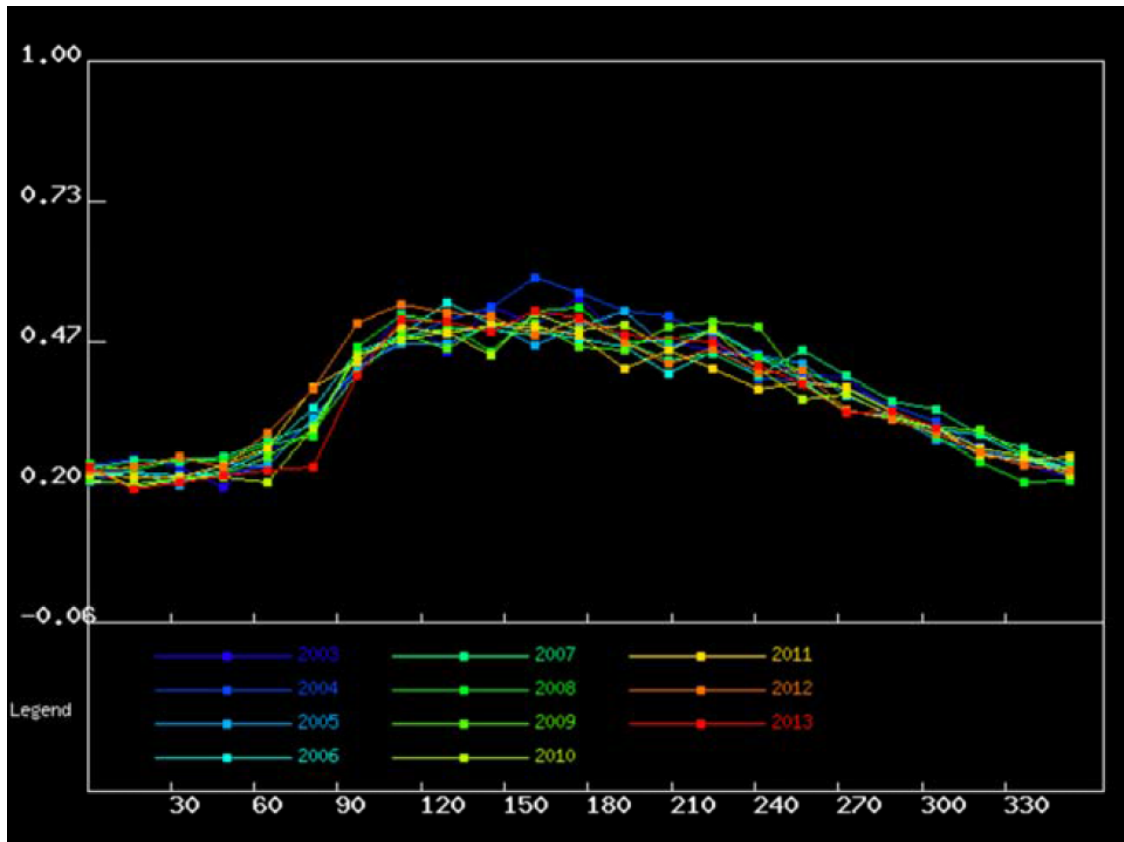


Figure 11: MODIS-EVI greenness (y-axis = EVI ratio) as a function of time (x-axis = DOY) for the years 2003-2013 at the NEON DELA site.

Table 19: Average MODIS-EVI greenness dates for the NEON DELA site, based on data from 2003-2013 (DOY, with MM/DD in parentheses).

Average Increase	Average Maximum	Average Decrease	Average Minimum
60 (03/02)	135 (05/16)	205 (07/25)	330 (11/27)

MODIS Product Details

- Product: MODIS-EVI phenology product, 16 day interval, 250 m grid, data included from all pixels with acceptable quality within user-defined square that roughly overlaps the TOS site boundary.
- Date range: 2003-2013
- User selected area: 10.25 km x 10.25 km box, Centroid Latitude: 32.541843, Longitude: -87.804186 (WGS84 datum)

5.3 Belowground Biomass

5.3.1 Site-Specific Methods

Belowground biomass characterization data were collected down to a depth of 180 cm by NEON staff in April 2013. Since the NEON protocol for long-term, operational sampling of belowground biomass only collects data to a depth of 30 cm, the belowground biomass site characterization data are critical for scaling belowground biomass measurements to greater depths; see the TOS Science Design for Plant Biomass, Productivity, and Leaf Area Index (AD[7]) for more information. Samples were collected following the standard methods outlined in TOS Site Characterization Methods (RD[6]). Roots were sorted to two diameter size categories (≤ 2 mm and 2-30 mm) and by root status (live or dead). The tables below summarize all the belowground biomass less than or equal to 30 mm diameter; size class data and more information can be found by searching the NEON data portal for the data product numbers in Appendix A.

5.3.2 Results

Table 20: Soil Pit Information at DELA.

Latitude	Longitude	Soil Family	Soil Order
32.54092	-87.80341	Fine - mixed - semiactive - thermic Aquic Paleudults	Ultisol

Soil Profile was described by Natural Resource Conservation Service (NRCS).

Table 21: Fine root mass per depth increment (cm) at DELA.

Upper Depth	Lower Depth	Mean (mg per cm ³)	Std Dev
0	10	2.61	1.49
10	20	1.28	0.32
20	30	1.57	1.7
30	40	0.43	0.25
40	50	2.25	1.86
50	60	0.22	0.22
60	70	0.42	0.4
70	80	0.19	0.14
80	90	0.25	0.19
90	100	0.52	0.66
100	120	0.32	0.4
120	140	0.14	0.08
140	160	0.01	0.02

<i>Title:</i> TOS Site Characterization Report: Domain 08		<i>Date:</i> 12/05/2018
<i>NEON Doc. #:</i> NEON.DOC.003892	<i>Author:</i> R.Krauss	<i>Revision:</i> B

Upper Depth	Lower Depth	Mean (mg per cm³)	Std Dev
160	180	0	0

Table 22: Cumulative fine root mass as a function of depth (cm) at DELA.

Upper Depth	Lower Depth	Mean Cumulative (g per m²)	Cumulative Std Dev
0	10	260.75	149.44
10	20	388.53	131.79
20	30	545.92	290.26
30	40	588.57	310.43
40	50	813.37	482.61
50	60	835.55	477.25
60	70	878.04	511.79
70	80	897.51	510.65
80	90	922.96	494.87
90	100	975.03	483.18
100	120	1038.33	480.19
120	140	1066.41	471.96
140	160	1069.03	475.52
160	180	1069.03	475.52

Title: TOS Site Characterization Report: Domain 08		Date: 12/05/2018
NEON Doc. #: NEON.DOC.003892	Author: R.Krauss	Revision: B

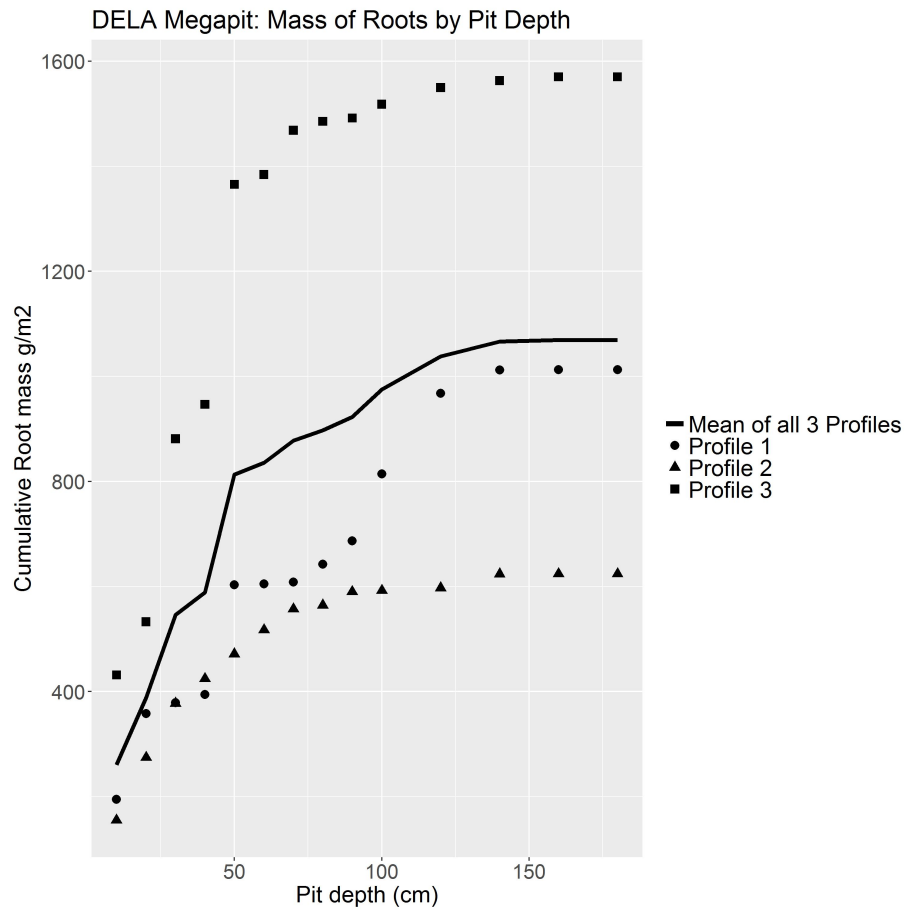


Figure 12: Cumulative root mass by pit depth at DELA.

Title: TOS Site Characterization Report: Domain 08		Date: 12/05/2018
NEON Doc. #: NEON.DOC.003892	Author: R.Krauss	Revision: B

Table 23: Fine root biomass sampling summary data at DELA.

Total Pit Depth (cm)	180
Total Mean Cumulative Mass at 30cm (g per m ²)	545.92
Total Mean Cumulative Mass at 100cm (g per m ²)	975.03
Total Mean Cumulative Mass (g per m ²)	1069.03

5.4 Plant Characterization and Phenology Species Selection

5.4.1 Site-Specific Methods

Plant characterization data were collected by NEON staff in July 2015. Plant characterization data informs sampling procedures for plant phenology and plant productivity protocols.

The overall ranking (“Rank” in the table below) was calculated based on three separate measurements. Overall ranking weights are influenced by the number of species within each grouping.

1. Mean percent cover values were calculated based on species specific cover estimation for all plant species under 3m tall in eight 1m by 1m subplots per plot; see the TOS Protocol and Procedure: Plant Diversity Sampling (RD[09]) for more information.
2. Mean canopy area values were calculated based on all species specific shrub canopy diameter measurements within the entire plot or subplot; see the TOS Protocol and Procedure: Measurement of Vegetation Structure (RD[10]) for more information.
3. Mean ABH (area at breast height) measurements were calculated based on diameter at breast height measurements for all woody vegetation with a diameter greater than 1cm at 130cm height within the entire plot or subplot; see the TOS Protocol and Procedure: Measurement of Vegetation Structure (RD[10]) for more information.

The standard field methods and ranking calculations are further outlined in TOS Site Characterization Methods (RD[6]). For more information on this protocol and data product numbers see Appendix A.

5.4.2 Results

Table 24: Site plant characterization and phenology species summary at DELA.

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
QUNI	<i>Quercus nigra</i> L.	1	<1	NA	3.32
ARGI	<i>Arundinaria gigantea</i> (Walter) Muhl.	10	2	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
MECA3	<i>Menispermum canadense</i> L.	100	<1	NA	NA
MISC	<i>Mikania scandens</i> (L.) Willd.	100	<1	NA	NA
POPU5	<i>Polygonum punctatum</i> Elliott	100	<1	NA	NA
ROCA4	<i>Rosa carolina</i> L.	100	<1	NA	NA
VITIS	<i>Vitis</i> sp.	104	<1	NA	0.01
FAGR	<i>Fagus grandifolia</i> Ehrh.	105	NA	NA	0.01
ARSE3	<i>Aristolochia serpentaria</i> L.	106	<1	NA	NA
RUCA4	<i>Ruellia caroliniensis</i> (J.F. Gmel.) Steud.	106	<1	NA	NA
CAAQ2	<i>Carya aquatica</i> (Michx. f.) Nutt.	108	NA	NA	0.01
CELA	<i>Celtis laevigata</i> Willd.	109	<1	NA	2.38
CELA	<i>Celtis laevigata</i> Willd.	109	<1	NA	2.38
ONSE	<i>Onoclea sensibilis</i> L.	109	<1	NA	NA
PAGL17	<i>Packera glabella</i> (Poir.) C. Jeffrey	109	<1	NA	NA
FRPE	<i>Fraxinus pennsylvanica</i> Marshall	11	<1	0	0.49
IPPU2	<i>Ipomoea purpurea</i> (L.) Roth	115	<1	NA	NA
TADI2	<i>Taxodium distichum</i> (L.) Rich.	117	NA	NA	0
QUMO4	<i>Quercus montana</i> Willd.	118	NA	NA	0
ARCH	<i>Acalypha rhomboidea</i> Raf.	119	<1	NA	NA
ARDR	<i>Arabis drummondii</i> A. Gray	119	<1	NA	NA
CAREXSPP	<i>Carex</i> sp.	119	<1	NA	NA
DICHA2SPP	<i>Dichanthelium</i> sp.	119	<1	NA	NA
NYAQ	<i>Nymphoides aquatica</i> (J.F. Gmel.) Kuntze	119	<1	NA	NA
PALU2	<i>Passiflora lutea</i> L.	119	<1	NA	NA
POACEA	Poaceae sp.	119	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
SMBO2	<i>Smilax bona-nox</i> L.	119	<1	NA	NA
SMTA2	<i>Smilax tamnoides</i> L.	119	<1	NA	NA
NYBI	<i>Nyssa biflora</i> L.	12	NA	NA	0.95
VIAE	<i>Vitis aestivalis</i> Michx.	129	<1	NA	0
CAOV2	<i>Carya ovata</i> (Mill.) K. Koch	13	<1	NA	0.92
VIRO2	<i>Viola rotundifolia</i> Michx.	130	NA	NA	0
ANDRO2	<i>Andropogon</i> sp.	131	<1	NA	NA
AQUIL	<i>Aquilegia</i> sp.	131	<1	NA	NA
ARTO3	<i>Aristolochia tomentosa</i> Sims	131	<1	NA	NA
ASPE	<i>Asclepias perennis</i> Walter	131	<1	NA	NA
COREO2	<i>Coreopsis</i> sp.	131	<1	NA	NA
DUIN2	<i>Duchesnea</i> <i>indica</i> (Andrews) Teschem.	131	<1	NA	NA
JUOV	<i>Justicia ovata</i> (Walter) Lindau	131	<1	NA	NA
RUELL	<i>Ruellia</i> sp.	131	<1	NA	NA
SMILA2	<i>Smilax</i> sp.	131	<1	NA	NA
ILDE	<i>Ilex decidua</i> Walter	14	<1	0	0.01
MYMA	<i>Myosotis macrosperma</i> Englem.	143	NA	NA	0
LIBE3	<i>Lindera benzoin</i> (L.) Blume	144	NA	NA	0
QUAL	<i>Quercus alba</i> L.	15	NA	NA	0.91
QULY	<i>Quercus lyrata</i> Walter	16	<1	NA	0.81
ULAM	<i>Ulmus americana</i> L.	17	<1	NA	0.79
BICA	<i>Bignonia capreolata</i> L.	18	2	NA	0
MORU2	<i>Morus rubra</i> L.	19	<1	NA	0.56
CELA	<i>Celtis laevigata</i> Willd.	2	<1	0	2.38
QUPA5	<i>Quercus pagoda</i> Raf.	20	NA	NA	0.58
CYPER	<i>Cyperus</i> sp.	21	1	NA	NA
ASTR	<i>Asimina triloba</i> (L.) Dunal	22	<1	NA	0.03
BROV4	<i>Brunnichia ovata</i> (Walter) Shinners	23	1	NA	0

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
QUMI	<i>Quercus michauxii</i> Nutt.	24	NA	NA	0.48
VIRO3	<i>Vitis rotundifolia</i> Michx.	25	<1	NA	0.04
CAAQ2	<i>Carya aquatica</i> (Michx. f.) Nutt.	26	NA	NA	0.01
RUBUS	<i>Rubus</i> sp.	28	<1	NA	NA
PAQU2	<i>Parthenocissus quinquefolia</i> (L.) Planch.	29	<1	NA	0
ACRU	<i>Acer rubrum</i> L.	3	<1	0	2.74
COFO	<i>Cornus foemina</i> Mill.	30	<1	0	NA
ACNE2	<i>Acer negundo</i> L.	31	<1	NA	0.25
SACE	<i>Saururus cernuus</i> L.	32	<1	NA	NA
PLOC	<i>Platanus occidentalis</i> L.	33	NA	NA	0.3
POACEA	Poaceae sp.	35	<1	NA	NA
DIVI4	<i>Dioscorea villosa</i> L.	36	<1	NA	NA
AMAR5	<i>Ampelopsis arborea</i> (L.) Koehne	37	<1	NA	0
QUVE	<i>Quercus velutina</i> Lam.	38	<1	NA	0.18
BOCY	<i>Boehmeria cylindrica</i> (L.) Sw.	39	<1	NA	NA
CACA18	<i>Carpinus caroliniana</i> Walter	4	<1	0.01	0.55
ASTR	<i>Asimina triloba</i> (L.) Dunal	40	<1	NA	0.03
CAGL8	<i>Carya glabra</i> (Mill.) Sweet	41	<1	NA	0.18
SMRO	<i>Smilax rotundifolia</i> L.	43	<1	NA	NA
CARA2	<i>Campsis radicans</i> (L.) Seem. ex Bureau	44	<1	NA	0
CARYA	<i>Carya</i> sp.	45	<1	NA	0.01
DICHA2	<i>Dichanthelium</i> sp.	46	<1	NA	NA
COCA	<i>Cocculus carolinus</i> (L.) DC.	47	<1	NA	0
QUSH	<i>Quercus schumardii</i> Buckley	48	NA	NA	0.11
LOSE	<i>Lonicera sempervirens</i> L.	49	<1	NA	NA
LISI	<i>Ligustrum sinense</i> Lour.	5	<1	0.01	0

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
TRDI	<i>Trachelospermum difforme</i> (Walter) A. Gray	50	<1	NA	NA
TRSE6	<i>Triadica sebifera</i> (L.) Small	51	<1	NA	0.11
CEPHA	<i>Cephalanthus</i> sp.	52	NA	0	NA
LOJA	<i>Lonicera japonica</i> Thunb.	53	<1	NA	NA
CECA4	<i>Cercis canadensis</i> L.	54	NA	NA	0.02
QUST	<i>Quercus stellata</i> Wangenh.	55	NA	NA	0.08
LIJA	<i>Ligustrum japonicum</i> Thunb.	56	<1	NA	0
SAMI8	<i>Sabal minor</i> (Jacq.) Pers.	57	<1	NA	NA
DESMO	<i>Desmodium</i> sp.	58	<1	NA	NA
QUPH	<i>Quercus phellos</i> L.	59	<1	NA	NA
TORA2	<i>Toxicodendron radicans</i> (L.) Kuntze	6	5	NA	0.01
BENI	<i>Betula nigra</i> L.	60	NA	NA	0.06
DIV15	<i>Diospyros virginiana</i> L.	61	<1	NA	0.04
SMSM	<i>Smilax smallii</i> Morong	62	<1	NA	NA
SMGL	<i>Smilax glauca</i> Walter	63	<1	NA	NA
VIOLA	<i>Viola</i> sp.	64	<1	NA	NA
LESPE	<i>Lespedeza</i> sp.	66	<1	NA	NA
MAGO	<i>Matelea gonocarpus</i> (Walter) Shinnars	66	<1	NA	NA
SANIC4	<i>Sambucus nigra</i> L. ssp. <i>canadensis</i> (L.) R. Bolli	66	<1	NA	NA
RUAR2	<i>Rubus argutus</i> Link	69	<1	NA	NA
CATO6	<i>Carya tomentosa</i> (Lam.) Nutt.	7	<1	NA	2.1
JUVI	<i>Juniperus virginiana</i> L.	70	<1	NA	0
VICI2	<i>Vitis cinerea</i> (Engelm.) Engelm. ex Millard	71	<1	NA	0.02
SMBO2	<i>Smilax bona-nox</i> L.	72	<1	NA	NA
SOLID	<i>Solidago</i> sp.	73	<1	NA	NA
MIRE	<i>Mitchella repens</i> L.	74	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
MORU2	<i>Morus rubra</i> L.	74	<1	NA	0.56
ARDR	<i>Arabis drummondii</i> A. Gray	77	<1	NA	NA
BESC	<i>Berchemia scandens</i> (Hill) K. Koch	78	<1	NA	0.01
QUERC	<i>Quercus</i> sp.	79	<1	NA	0.02
LIST2	<i>Liquidambar styraciflua</i> L.	8	<1	NA	1.67
DIFR6	<i>Ditrysinia fruticosa</i> (W. Bartram) Govaerts & Frodin	80	<1	NA	NA
IPOMO	<i>Ipomoea</i> sp.	81	<1	NA	NA
VILA8	<i>Vitis labrusca</i> L.	81	<1	NA	NA
CECA4	<i>Cercis canadensis</i> L.	84	NA	NA	0.02
ASTER	<i>Aster</i> sp.	85	<1	NA	NA
CEOC2	<i>Cephalanthus occidentalis</i> L.	86	<1	NA	0.01
QUHE2	<i>Quercus hemisphaerica</i> W. Bartram ex Willd.	88	<1	NA	0.02
LYJA	<i>Lygodium japonicum</i> (Thunb.) Sw.	89	<1	NA	NA
FRAM2	<i>Fraxinus americana</i> L.	9	<1	0	0.65
RUAR2	<i>Rubus argutus</i> Link	90	<1	NA	NA
QULA3	<i>Quercus laurifolia</i> Michx.	91	NA	NA	0.02
CECA4	<i>Cercis canadensis</i> L.	92	NA	NA	0.02
CAAM2	<i>Callicarpa americana</i> L.	93	<1	NA	0
AMARA	<i>Amaranthus</i> sp.	94	<1	NA	NA
CLEMA	<i>Clematis</i> sp.	94	<1	NA	NA
DICHA2	<i>Dichanthelium</i> sp.	94	<1	NA	NA
SACA15	<i>Sanicula canadensis</i> L.	98	<1	NA	NA
MEAZ	<i>Melia azedarach</i> L.	99	NA	NA	0.01

Note: Taxon IDs and scientific names are based on the USDA Plants database (plants.usda.gov). Plants identified as *Fraxinus americana* are likely *F. pennsylvanica*. Plants identified as *Quercus velutina* are likely immature *Q. pagoda*. Plants identified as *Q. stellata* are likely *Q. lyrata*. Plants identified as *Q. hemisphaerica* are likely *Q. phellos*. Plants identified as *Q. montana* are likely *Q. michauxii*. Plants identified as *Carya glabra* are likely immature *C. ovata*.

Plants identified as *Lonicera sempervirens* are likely *Trachelopermum difforme*. Species that are repeated in the ranking indicate that some individuals were recorded as the incorrect USDA code in the field and then corrected after analysis.

Table 25: Per plot breakdown of species richness, diversity, and herbaceous cover at DELA.

Plot ID	Species Richness	Shannon Diversity Index	Percent Total Herbaceous Cover	Bryophyte Percent Cover
DELA_037	27	2.86	82	0.5
DELA_038	47	2.87	112	0.88
DELA_039	30	3.04	107	4
DELA_040	21	2	75	0.62
DELA_041	18	2.21	107	0
DELA_042	27	2.44	163	0.38
DELA_043	21	2.62	78	0.56
DELA_044	22	2.69	95	0.56
DELA_045	29	2.76	170	0
DELA_046	23	2.44	49	0.56
DELA_047	22	2.77	95	0.57
DELA_048	27	2.83	48	1.06
DELA_050	21	2.64	105	1.12
DELA_051	13	1.86	21	1.56
DELA_052	33	3.24	147	4.75
DELA_053	27	2.62	80	0
DELA_054	17	2.19	70	0
DELA_055	22	2.88	34	0.38
DELA_056	29	2.94	88	0.38
Bryophyte Mean				0.94

Note: Percent herbaceous cover was measured by species and then added together to calculate the percent total herbaceous cover for each plot.

Bryophyte percent cover data were used to determine which sites qualify for implementation of the Bryophyte Productivity protocol. However, bryophyte productivity sampling was discontinued in 2018 and NEON no longer implements this protocol.

5.5 Beetles

5.5.1 Site-Specific Methods

Beetle site characterization was conducted in June of 2014 following the standard methods outlined in TOS Site Characterization Methods (RD[6]). Beetle site characterization data were collected to start site level teaching collections. All samples were pooled before being sent for identification. For DNA sequence data generated as a result of these efforts, visit the Barcode of Life Datasystems (BOLD) at <http://www.boldsystems.org>. For more information on this protocol and data product numbers see Appendix A.

5.5.2 Results

Table 26: Beetle identification results at DELA.

Sample ID	Scientific Name	Sex
NEONcarabid8282	<i>Dicaelus sculptilis</i>	F
NEONcarabid8283	<i>Dicaelus sculptilis</i>	F
NEONcarabid8284	<i>Dicaelus sculptilis</i>	M
NEONcarabid8285	<i>Dicaelus sculptilis</i>	F
NEONcarabid8286	<i>Dicaelus sculptilis</i>	F
NEONcarabid8287	<i>Dicaelus sculptilis</i>	F
NEONcarabid8288	<i>Dicaelus sculptilis</i>	F
NEONcarabid8289	<i>Dicaelus sculptilis</i>	F
NEONcarabid8290	<i>Dicaelus sculptilis</i>	M
NEONcarabid8291	<i>Dicaelus sculptilis</i>	F
NEONcarabid8292	<i>Dicaelus sculptilis</i>	M
NEONcarabid8293	<i>Dicaelus sculptilis</i>	F
NEONcarabid8294	<i>Dicaelus sculptilis</i>	F
NEON8281	<i>Dicaelus dilatatus</i>	F

Note: Samples that include “carabid” in their sample ID indicate BOLD records are available. Samples without “carabid” were identified by a parataxonomist.

5.6 Mosquitoes

5.6.1 Site-Specific Methods

Mosquito site characterization was conducted in June of 2014 following the standard methods outlined in TOS Site Characterization Methods (RD[6]) to test protocol methods and start site level species lists. No pathogen test-

ing was performed. All samples were pooled before being sent for identification. For more information on this protocol and data product numbers see Appendix A.

5.6.2 Results

Table 27: Mosquito identification results at DELA.

Sample ID	Scientific Name	Count
DELA.30June2014.SC.1	<i>Aedes vexans</i>	33
DELA.30June2014.SC.1	<i>Anopheles crucians</i>	2
DELA.30June2014.SC.1	<i>Anopheles quadrimaculatus</i>	24
DELA.30June2014.SC.1	Anopheles spp.	2
DELA.30June2014.SC.1	<i>Coquillettidia perturbans</i>	3
DELA.30June2014.SC.1	<i>Culex erraticus</i>	38
DELA.30June2014.SC.1	<i>Culex nigripalpus</i>	2
DELA.30June2014.SC.1	<i>Mansonia titillans</i>	5
DELA.30June2014.SC.1	Psorophora spp.	2

5.7 Ticks

5.7.1 Site-Specific Methods

Tick drags were conducted at DELA in June of 2014 to test protocol methods and calculate capture rates. No pathogen testing was performed. All samples were pooled before being sent for identification. For more information on this protocol and data product numbers see Appendix A.

5.7.2 Results

Table 28: Tick identification results at DELA.

Sample ID	Scientific Name	Sex
DELA_000.20140730.SC.1	<i>Amblyomma maculatum</i>	M

5.8 Species Reference Lists

A review of the literature for taxonomic lists of interest for each site was conducted prior to field work. In the case of vertebrates that NEON may capture (e.g., reptiles, amphibians, small mammals), these lists were often required to secure permits. Key references identified in this effort are listed below. Species lists and associated references

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for small mammals and breeding landbirds can be found in the appendices of the respective protocols (RD[07], RD[08]).

Bousquet, Y. 2012. Catalogue of Geadephaga (Coleoptera, Adephaga) of America, north of Mexico. ZooKeys, (245), 1-1722.

Centers for Disease Control and Prevention. (2015). *Geographic distribution of ticks that bite humans*. Retrieved from http://www.cdc.gov/ticks/geographic_distribution.html

Darsie Jr., R. F., and R. A. Ward. 2005. Identification and geographical distribution of the mosquitoes of North America, North of Mexico. University Press of Florida, Gainesville.

Keener, B. R., A.R. Diamond, L. J. Davenport, P. G. Davison, S. L. Ginzburg, C. J. Hansen, C. S. Major, D. D. Spaulding, J. K. Triplett, and M. Woods. 2016. Alabama Plant Atlas. [S.M. Landry and K.N. Campbell (original application development), Florida Center for Community Design and Research. University of South Florida]. University of West Alabama, Livingston, Alabama.

Mount, R. H. 1975. The Reptiles and Amphibians of Alabama. Auburn Univ. Agr. Exp. Sta., Auburn. Alabama.

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6 RELOCATABLE SITE 2- LENOIR LANDING (LENO)

LENO is a hardwood bottomland with seasonal flooding each spring located in southwest Alabama. The tower and Tower Plots are located at Lenoir Landing and the Distributed Plots are located approximately 5km south of the tower at Choctaw National Wildlife Refuge.

NEON.D08.LENO.DP1.00033 - NetCam SC IR - Sun Apr 02 2017 18:00:06 UTC
Camera Temperature: 51.5
Exposure: 35



Figure 13: Phenocamera image for LENO. The phenocamera is located at the top of the NEON tower and faces north. Phenocamera images are available at <https://phenocam.sr.unh.edu/webcam/network/table/>.

Key Characteristics:

- Site host: U.S. Army Corps of Engineers, Choctaw National Wildlife Refuge- U.S. Fish and Wildlife Service
- Located in: Choctaw County, Alabama
- Sampling Area: 7.68 km²
- Plot Elevation: 5-30m
- Dominant vegetation type: The ecosystem at LENO is dominated by closed-canopy pine-oak mixed forest with a developed understory, and also includes a small fraction of meadows, wetlands, and smaller water bodies. Dominant plant species include American sweetgum (*Liquidambar styraciflua*), American hornbeam (*Carpinus caroliniana*), and loblolly pine (*Pinus taeda*).
- General management: Choctaw National wildlife Refuge provides a protected wintering area for waterfowl

and wood duck brood habitat.

- LENO is paired with the Lower Tombigbee river aquatic site. See the AIS site characterization report for more details (RD[05]).
- Plot Selection: NEON TOS Plots were allocated across the site following NEON standard criteria and avoiding existing research.

6.1 TOS Spatial Sampling Design

TOS Distributed Plots were allocated at LENO according to a spatially balanced and stratified-random design (RD[3]). The 2006 National Land Cover Database (NLCD) was selected for stratification because of the consistent and comparable data availability across the United States. TOS Tower Plots were allocated according to a spatially balanced design in and around the NEON tower airshed (RD[03]). The maps below depict the plot locations for the first year of NEON sampling. Some plot locations may change over time due to logistics, safety, and science requirements. Please visit the NEON website (<http://www.neonscience.org>) for updated plot locations at each site.

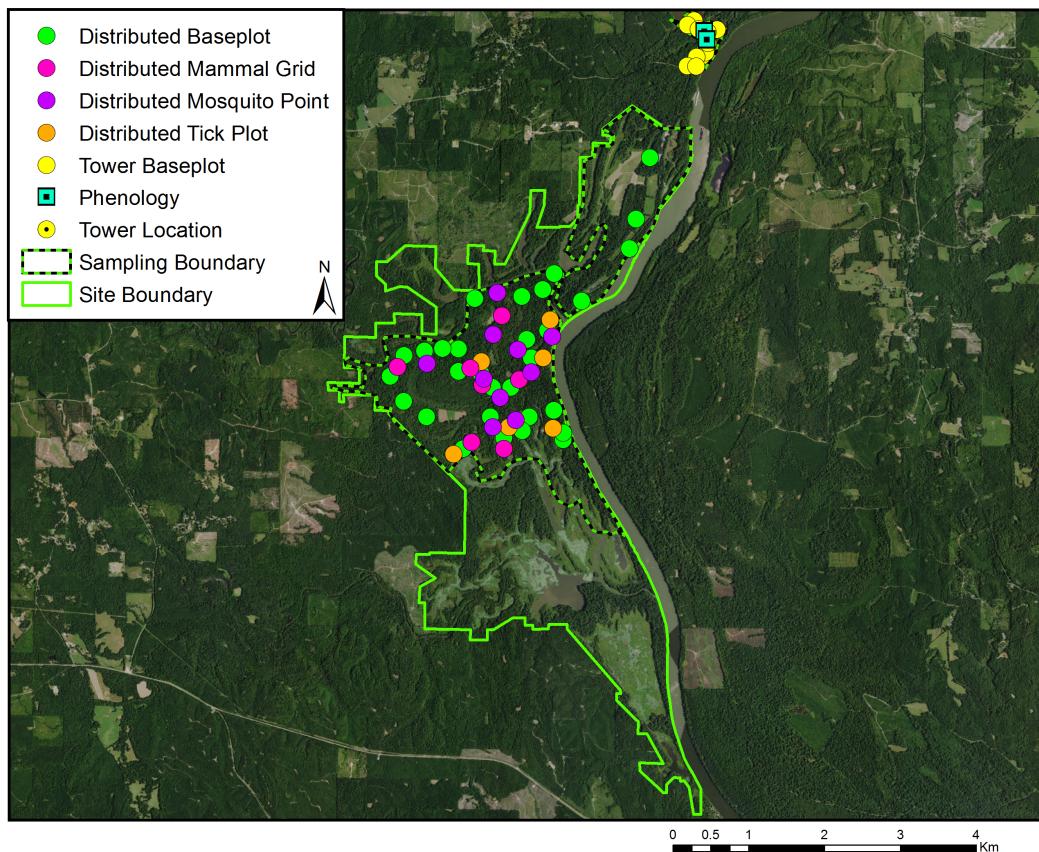


Figure 14: Map of TOS plot centroids within the NEON TOS sampling boundary at LENO.

For a list of protocols associated with each plot see tables below; for additional spatial design information see

RD[03].

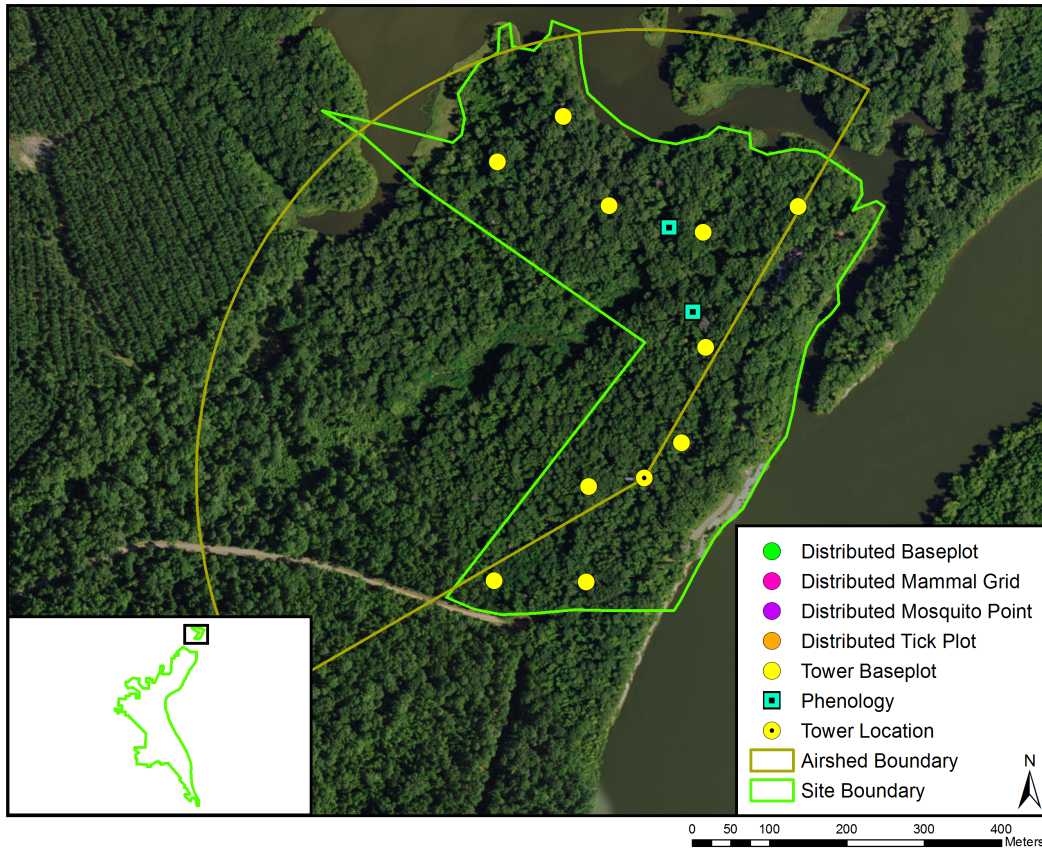


Figure 15: Map of the tower airshed and TOS plot centroids at LENO.

More information about the tower airshed can be found in the TIS site characterization report (RD[04]).

Table 29: NLCD land cover classes and area within the TOS site boundary at LENO.

NLCD Class	Site Area (km ²)	Percent (%)
Woody Wetlands	4.3	58.3
Deciduous Forest	1.92	26.02
Open Water	0.51	6.97
Developed Open Space	0.25	3.44
Pasture Hay	0.25	3.39
Shrub Scrub	0.06	0.81
Mixed Forest	0.04	0.48
Barren Land	0.02	0.22
Grassland Herbaceous	0.01	0.2
Evergreen Forest	0.01	0.18

Note: Any NLCD land cover classes less than 5% will not be sampled. Additionally, no sampling will take place in Water, Developed, or Barren Land NLCD classes.

Table 30: NLCD land cover classes and TOS plot numbers at LENO.

Plot Type	Plot Subtype	NLCD Class	Number of Plots Established
Distributed	Base	Woody Wetlands	18
Distributed	Base	Deciduous Forest	12
Distributed	Mammal	Woody Wetlands	4
Distributed	Mammal	Deciduous Forest	3
Distributed	Mosquito	Woody Wetlands	7
Distributed	Mosquito	Deciduous Forest	3
Distributed	Tick	Woody Wetlands	4
Distributed	Tick	Deciduous Forest	2
Tower	Base Plot	NA	10
Tower	Phenology Plot	NA	2

Note: NLCD land cover classes are not used to stratify Tower Plots which are located in and around the NEON tower airshed. The dominant NLCD land cover types within the airshed are Deciduous Forest and Woody Wetlands.

Table 31: Number of Distributed Base plots per NLCD land cover class per protocol at LENO.

Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Deciduous Forest	Beetles	3
Distributed	Base Plot	Woody Wetlands	Beetles	7
Distributed	Base Plot	Deciduous Forest	Birds	7
Distributed	Base Plot	Woody Wetlands	Birds	16
Distributed	Base Plot	Deciduous Forest	Canopy Foliage Chemistry	3
Distributed	Base Plot	Woody Wetlands	Canopy Foliage Chemistry	7
Distributed	Base Plot	Deciduous Forest	Coarse Downed Wood	7
Distributed	Base Plot	Woody Wetlands	Coarse Downed Wood	13
Distributed	Base Plot	Deciduous Forest	Digital Hemispherical Photos for Leaf Area Index	7
Distributed	Base Plot	Woody Wetlands	Digital Hemispherical Photos for Leaf Area Index	13
Distributed	Base Plot	Deciduous Forest	Herbaceous Biomass	7
Distributed	Base Plot	Woody Wetlands	Herbaceous Biomass	13
Distributed	Base Plot	Deciduous Forest	Plant Diversity	12
Distributed	Base Plot	Woody Wetlands	Plant Diversity	18
Distributed	Base Plot	Deciduous Forest	Soil Biogeochemistry	2
Distributed	Base Plot	Woody Wetlands	Soil Biogeochemistry	4
Distributed	Base Plot	Deciduous Forest	Soil Microbes	2
Distributed	Base Plot	Woody Wetlands	Soil Microbes	4
Distributed	Base Plot	Deciduous Forest	Vegetation Structure	7
Distributed	Base Plot	Woody Wetlands	Vegetation Structure	14

Note: Distributed Base Plots typically support more than one TOS protocol; ‘Number of Plots’ cannot be added to get total TOS Distributed Base Plot number.

Table 32: Number of Tower Plots per protocol at LENO.

Plot Type	Plot Subtype	Protocols	Number of Plots
Tower	Base Plot	Canopy Foliage Chemistry	4
Tower	Base Plot	Coarse Downed Wood	10
Tower	Base Plot	Digital Hemispherical Photos for Leaf Area Index	3
Tower	Base Plot	Herbaceous Biomass	10
Tower	Base Plot	Litterfall and Fine Woody Debris	10

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Plot Type	Plot Subtype	Protocols	Number of Plots
Tower	Base Plot	Plant Belowground Biomass	10
Tower	Base Plot	Plant Diversity	3
Tower	Base Plot	Soil Biogeochemistry	4
Tower	Base Plot	Soil Microbes	4
Tower	Base Plot	Vegetation Structure	10
Tower	Phenology	Plant Phenology	2

Note: Tower Base Plots typically support more than one TOS protocol; ‘Number of Plots’ cannot be added to get total TOS Tower Base Plot number.

6.2 Sampling Season Characterization: LENO

For numerous TOS protocols, the length of the sampling season, the number of bouts, and when those bouts occur is dictated by the seasonal status of the plant community. By monitoring ‘greenness’ on a 16 day interval, the MODIS/Terra EVI phenology product provides consistent, reliable insight into plant community phenology and intensity at the continental scale. For those protocols for which timing is standardized by greenness transitions and/or peak green status, NEON has utilized these data as the primary means of guiding temporal aspects of TOS sampling at each site.

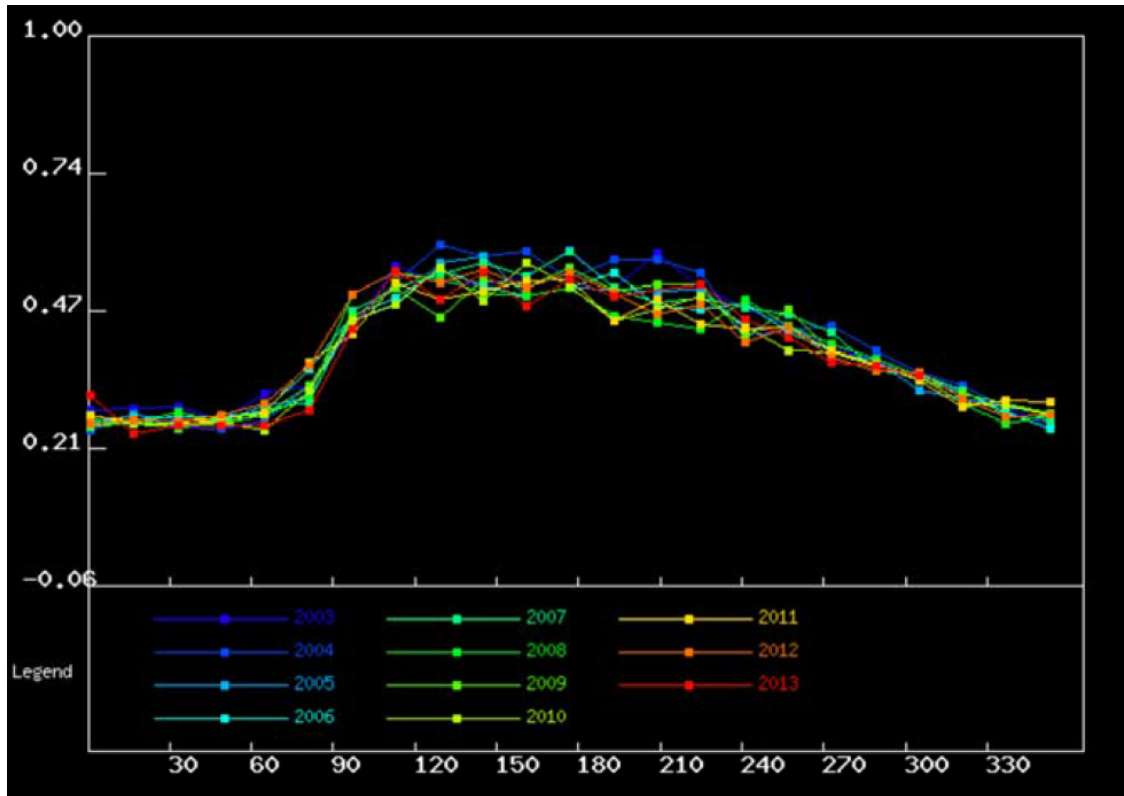


Figure 16: MODIS-EVI greenness (y-axis = EVI ratio) as a function of time (x-axis = DOY) for the years 2003-2013 at the NEON LENO site.

Table 33: Average MODIS-EVI greenness dates for the NEON LENO site, based on data from 2003-2013 (DOY, with MM/DD in parentheses).

Average Increase	Average Maximum	Average Decrease	Average Minimum
70 (03/12)	145 (05/26)	200 (07/20)	335 (12/02)

MODIS Product Details

- Product: MODIS-EVI phenology product, 16 day interval, 250 m grid, data included from all pixels with acceptable quality within user-defined square that roughly overlaps the TOS site boundary.
- Date range: 2003-2013
- User selected area: 18.25 km x 18.25 km box, Centroid Latitude: 31.835213, Longitude: -88.167641 (WGS84 datum)

6.3 Belowground Biomass

6.3.1 Site-Specific Methods

Belowground biomass characterization data were collected down to a depth of 200 cm by NEON staff in March 2015. Since the NEON protocol for long-term, operational sampling of belowground biomass only collects data to a depth of 30 cm, the belowground biomass site characterization data are critical for scaling belowground biomass measurements to greater depths; see the TOS Science Design for Plant Biomass, Productivity, and Leaf Area Index (AD[7]) for more information. Samples were collected following the standard methods outlined in TOS Site Characterization Methods (RD[6]). Roots were sorted to two diameter size categories (≤ 4 mm and 4-30 mm) and by root status (live or dead). The tables below summarize all the belowground biomass less than or equal to 30 mm diameter; size class data and more information can be found by searching the NEON data portal for the data product numbers in Appendix A.

6.3.2 Results

Table 34: Soil Pit Information at LENO.

Latitude	Longitude	Soil Family	Soil Order
31.8531	-88.16103	Fine - mixed - active - acid - thermic Vertic Epiaquepts	Inceptisol

Soil Profile was described by Natural Resource Conservation Service (NRCS).

Table 35: Fine root mass per depth increment (cm) at LENO.

Upper Depth	Lower Depth	Mean (mg per cm ³)	Std Dev
0	10	11.93	6.15
10	20	3.38	1.02
20	30	4.97	6.73
30	40	6.78	11.13
40	50	27.31	24.56
50	60	0.48	0.33
60	70	0.53	0.48
70	80	1.33	1.62
80	90	1.25	1.62
90	100	0.86	1.26
100	120	0.13	0.08
120	140	0.07	0.11
140	160	0.1	0.12

Upper Depth	Lower Depth	Mean (mg per cm³)	Std Dev
160	180	0.05	0.03
180	200	0.28	0.48

Table 36: Cumulative fine root mass as a function of depth (cm) at LENO.

Upper Depth	Lower Depth	Mean Cumulative (g per m²)	Cumulative Std Dev
0	10	1193.17	614.75
10	20	1530.93	513.28
20	30	2027.81	203.17
30	40	2705.63	1297.85
40	50	5437.03	3565.51
50	60	5485.37	3598.05
60	70	5538.69	3550.22
70	80	5671.46	3693.94
80	90	5796.29	3839.64
90	100	5881.93	3949.37
100	120	5907.22	3960.76
120	140	5922.05	3943.36
140	160	5941.63	3926.24
160	180	5951.38	3921.41
180	200	6008.13	3915.28

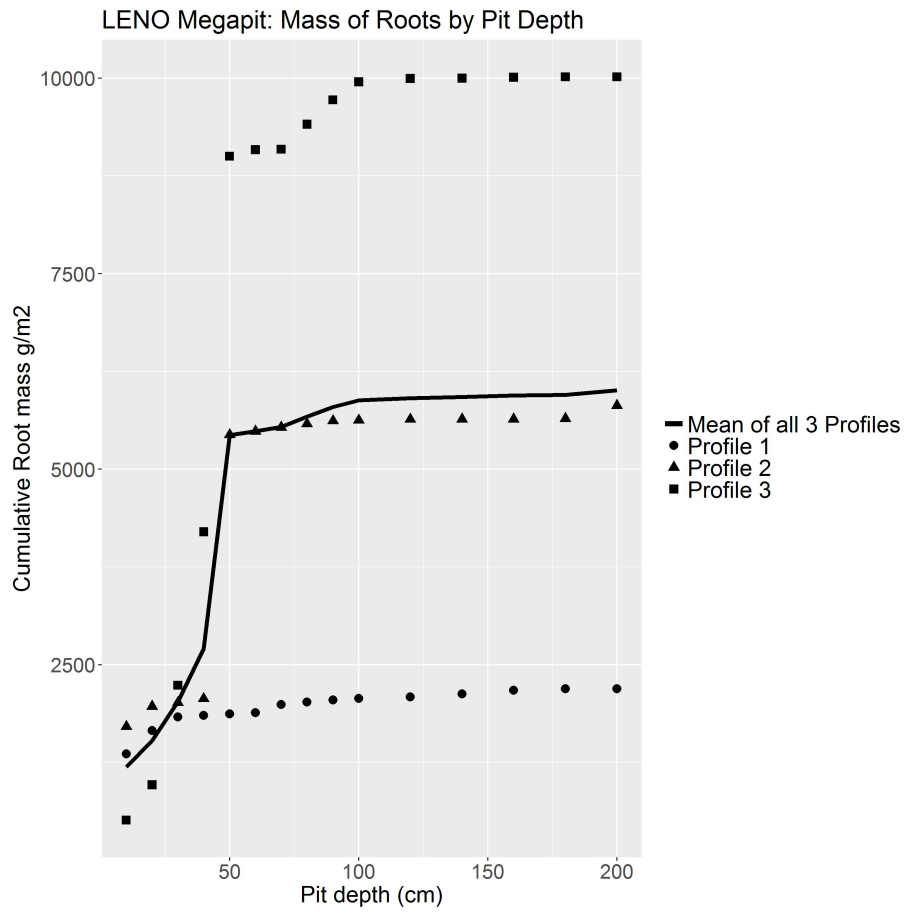


Figure 17: Cumulative root mass by pit depth at LENO.

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Table 37: Fine root biomass sampling summary data at LENO.

Total Pit Depth (cm)	200
Total Mean Cumulative Mass at 30cm (g per m ²)	2027.81
Total Mean Cumulative Mass at 100cm (g per m ²)	5881.93
Total Mean Cumulative Mass (g per m ²)	6008.13

6.4 Plant Characterization and Phenology Species Selection

6.4.1 Site-Specific Methods

Plant characterization data were collected by NEON staff in August 2015. Plant characterization data informs sampling procedures for plant phenology and plant productivity protocols.

The overall ranking (“Rank” in the table below) was calculated based on three separate measurements. Overall ranking weights are influenced by the number of species within each grouping.

1. Mean percent cover values were calculated based on species specific cover estimation for all plant species under 3m tall in eight 1m by 1m subplots per plot; see the TOS Protocol and Procedure: Plant Diversity Sampling (RD[09]) for more information.
2. Mean canopy area values were calculated based on all species specific shrub canopy diameter measurements within the entire plot or subplot; see the TOS Protocol and Procedure: Measurement of Vegetation Structure (RD[10]) for more information.
3. Mean ABH (area at breast height) measurements were calculated based on diameter at breast height measurements for all woody vegetation with a diameter greater than 1cm at 130cm height within the entire plot or subplot; see the TOS Protocol and Procedure: Measurement of Vegetation Structure (RD[10]) for more information.

The standard field methods and ranking calculations are further outlined in TOS Site Characterization Methods (RD[6]). For more information on this protocol and data product numbers see Appendix A.

6.4.2 Results

Table 38: Site plant characterization and phenology species summary at LENO.

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
LIST2	<i>Liquidambar styraciflua</i> L.	1	1	NA	10.12
QUPA5	<i>Quercus pagoda</i> Raf.	10	<1	NA	1.45
WISTE	<i>Wisteria</i> sp.	100	NA	NA	0

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
CACO15	<i>Carya cordiformis</i> (Wangenh.) K. Koch	11	NA	NA	1.17
HADI3	<i>Halesia diptera</i> Ellis	12	<1	0.01	0.48
ULAM	<i>Ulmus americana</i> L.	13	<1	NA	0.75
ILOP	<i>Ilex opaca</i> Aiton	14	<1	0.01	0.22
CYPER	<i>Cyperus</i> sp.	15	4	NA	NA
NYSY	<i>Nyssa sylvatica</i> Marshall	16	<1	NA	0.64
CELA	<i>Celtis laevigata</i> Willd.	17	<1	0	0.33
LISI	<i>Ligustrum sinense</i> Lour.	18	<1	0.02	0
CAOV2	<i>Carya ovata</i> (Mill.) K. Koch	19	NA	NA	0.51
CACA18	<i>Carpinus caroliniana</i> Walter	2	2	0	2.45
QUPH	<i>Quercus phellos</i> L.	20	<1	NA	0.5
QULY	<i>Quercus lyrata</i> Walter	21	<1	NA	0.33
PAQU2	<i>Parthenocissus quinquefolia</i> (L.) Planch.	22	2	NA	0
TORA2	<i>Toxicodendron radicans</i> (L.) Kuntze	23	2	NA	0.04
CAAQ2	<i>Carya aquatica</i> (Michx. f.) Nutt.	24	NA	NA	0.37
DESMO	<i>Desmodium</i> sp.	25	2	NA	NA
LOJA	<i>Lonicera japonica</i> Thunb.	26	2	NA	NA
RUBUS	<i>Rubus</i> sp.	27	2	NA	NA
CATO6	<i>Carya tomentosa</i> (Lam.) Nutt.	28	<1	NA	0.25
PIGL2	<i>Pinus glabra</i> Walter	29	<1	NA	0.3
ILDE	<i>Ilex decidua</i> Walter	3	4	0.1	0.43
QUPA5	<i>Quercus pagoda</i> Raf.	30	<1	NA	1.45
DIV15	<i>Diospyros virginiana</i> L.	32	<1	NA	0.05
POTR4	<i>Poncirus trifoliata</i> (L.) Raf.	33	<1	NA	NA
RUCA4	<i>Ruellia caroliniensis</i> (J.F. Gmel.) Steud.	34	1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
ILVO	<i>Ilex vomitoria</i> Aiton	35	NA	NA	0
SILY	<i>Sideroxylon lycioides</i> L.	36	NA	NA	NA
BICA	<i>Bignonia capreolata</i> L.	37	<1	NA	NA
QUMI	<i>Quercus michauxii</i> Nutt.	39	<1	NA	0.02
PITA	<i>Pinus taeda</i> L.	4	<1	NA	2.63
MIRE	<i>Mitchella repens</i> L.	40	<1	NA	NA
LITU	<i>Liriodendron tulipifera</i> L.	41	NA	NA	0.13
SAAL5	<i>Sassafras albidum</i> (Nutt.) Nees	42	NA	NA	0.11
VIRO3	<i>Vitis rotundifolia</i> Michx.	43	<1	NA	0.04
PRSE	<i>Prenanthes serpentaria</i> Pursh	45	<1	NA	0.03
CARYA	<i>Carya</i> sp.	46	<1	NA	NA
ITVI	<i>Itea virginica</i> L.	47	NA	NA	NA
CRATA	<i>Crataegus</i> sp.	48	NA	NA	0.01
AMAR5	<i>Ampelopsis arborea</i> (L.) Koehne	49	<1	NA	NA
QUNI	<i>Quercus nigra</i> L.	5	<1	NA	1.76
ACRU	<i>Acer rubrum</i> L.	50	<1	NA	0.07
TRDI	<i>Trachelospermum difforme</i> (Walter) A. Gray	51	<1	NA	NA
CARA2	<i>Campsis radicans</i> (L.) Seem. ex Bureau	52	<1	NA	0.01
CLMA4	<i>Clitoria mariana</i> L.	53	<1	NA	NA
DICHA2	<i>Dichanthelium</i> sp.	54	<1	NA	NA
BROV4	<i>Brunnichia ovata</i> (Walter) Shinners	55	<1	NA	NA
VAEL	<i>Vaccinium elliottii</i> Chapm.	56	<1	NA	NA
SMBO2	<i>Smilax bona-nox</i> L.	57	<1	NA	NA
ARDR3	<i>Arisaema dracontium</i> (L.) Schott	58	<1	NA	NA
VIVU	<i>Vitis vulpina</i> L.	59	<1	NA	0.01
QUVE	<i>Quercus velutina</i> Lam.	6	<1	NA	2.23
ACNE2	<i>Acer negundo</i> L.	60	<1	NA	0.05

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
SACA15	<i>Sanicula canadensis</i> L.	61	<1	NA	NA
DIVI4	<i>Dioscorea villosa</i> L.	62	<1	NA	NA
CAGL8	<i>Carya glabra</i> (Mill.) Sweet	63	NA	NA	0.04
CAAQ2	<i>Carya aquatica</i> (Michx. f.) Nutt.	64	NA	NA	0.37
FAGR	<i>Fagus grandifolia</i> Ehrh.	65	NA	NA	0.03
SMRO	<i>Smilax rotundifolia</i> L.	66	<1	NA	NA
SMSM	<i>Smilax smallii</i> Morong	66	<1	NA	NA
SACE	<i>Saururus cernuus</i> L.	68	<1	NA	NA
SOLID	<i>Solidago</i> sp.	68	<1	NA	NA
FRPE	<i>Fraxinus pennsylvanica</i> Marshall	7	<1	NA	0.21
BOCY	<i>Boehmeria cylindrica</i> (L.) Sw.	70	<1	NA	NA
JUVI	<i>Juniperus virginiana</i> L.	71	NA	NA	0.02
MATEL	<i>Matelea</i> sp.	72	<1	NA	NA
URTIC	<i>Urtica</i> sp.	73	<1	NA	NA
ACSA2	<i>Acer saccharinum</i> L.	74	NA	NA	0.01
GALIU	<i>Galium</i> sp.	75	<1	NA	NA
SMGL	<i>Smilax glauca</i> Walter	75	<1	NA	NA
VICI2	<i>Vitis cinerea</i> (Engelm.) Engelm. ex Millard	77	NA	NA	0.01
COCA	<i>Cocculus carolinus</i> (L.) DC.	78	<1	NA	NA
HILA8	<i>Hieracium lachenalii</i> C.C. Gmel.	78	<1	NA	NA
QULA3	<i>Quercus laurifolia</i> Michx.	8	<1	NA	1.9
MORU2	<i>Morus rubra</i> L.	81	<1	NA	0
CECA4	<i>Cercis canadensis</i> L.	82	NA	NA	0.01
TIUS	<i>Tillandsia usneoides</i> (L.) L.	83	<1	NA	NA
JUOV	<i>Justicia ovata</i> (Walter) Lindau	84	<1	NA	NA
MECA3	<i>Menispermum canadense</i> L.	85	<1	NA	NA
OXALI	<i>Oxalis</i> sp.	85	<1	NA	NA

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area m ² per m ²	Mean ABH (cm ² per m ²)
TRDI	<i>Trachelospermum difforme</i> (Walter) A. Gray	85	<1	NA	NA
NYBI	<i>Nyssa biflora</i> Walter	89	NA	NA	0.01
SYTI	<i>Symplocos tinctoria</i> (L.) L'Hér.	9	NA	NA	1.9
IMCA	<i>Impatiens capensis</i> Meerb.	90	<1	NA	NA
ONSE	<i>Onoclea sensibilis</i> L.	90	<1	NA	NA
PALU2	<i>Passiflora lutea</i> L.	90	<1	NA	NA
SMTA2	<i>Smilax tamnoides</i> L.	90	<1	NA	NA
ARSE3	<i>Aristolochia serpentaria</i> L.	94	<1	NA	NA
LYVI4	<i>Lycopus virginicus</i> L.	94	<1	NA	NA
SANIC4	<i>Sambucus nigra</i> L. ssp. <i>canadensis</i> (L.) R. Bolli	94	<1	NA	NA
SMWA	<i>Smilax walteri</i> Pursh	94	<1	NA	NA
VIOLA	<i>Viola</i> sp.	94	<1	NA	NA

Note: Taxon IDs and scientific names are based on the USDA Plants database (plants.usda.gov). Plants identified as *Quercus velutina* are likely immature *Q. pagoda*. Plants identified as *Vitis vulpina* are likely *V. cinerea*. Species that are repeated in the ranking indicate that some individuals were recorded as the incorrect USDA code in the field and then corrected after analysis.

Table 39: Per plot breakdown of species richness, diversity, and herbaceous cover at LENO.

Plot ID	Species Richness	Shannon Diversity Index	Percent Total Herbaceous Cover
LENO_061	37	3.23	112
LENO_062	23	2.85	49
LENO_063	28	2.07	161
LENO_064	30	2.48	137
LENO_065	28	2.62	101
LENO_066	28	3.01	78
LENO_067	28	3.1	93
LENO_068	18	1.7	82
LENO_069	23	1.83	130
LENO_070	32	2.42	277

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Note: Percent herbaceous cover was measured by species and then added together to calculate the percent total herbaceous cover for each plot.

Bryophyte percent cover data were used to determine which sites qualify for implementation of the Bryophyte Productivity protocol. However, bryophyte productivity sampling was discontinued in 2018 and NEON no longer implements this protocol. No bryophyte cover was recorded in LENO Tower Base Plots.

6.5 Beetles

6.5.1 Site-Specific Methods

No beetle site characterization was conducted at LENO. For more information on this protocol and data product numbers see Appendix A.

6.6 Mosquitoes

6.6.1 Site-Specific Methods

No mosquito site characterization was conducted at LENO. For more information on this protocol and data product numbers see Appendix A.

6.7 Ticks

6.7.1 Site-Specific Methods

No tick site characterization was conducted at LENO. For more information on this protocol and data product numbers see Appendix A.

6.8 Species Reference Lists

A review of the literature for taxonomic lists of interest for each site was conducted prior to field work. In the case of vertebrates that NEON may capture (e.g., reptiles, amphibians, small mammals), these lists were often required to secure permits. Key references identified in this effort are listed below. Species lists and associated references for small mammals and breeding landbirds can be found in the appendices of the respective protocols (RD[07], RD[08]). See the DELA species reference list section for statewide resources.

Bousquet, Y. 2012. Catalogue of Geadephaga (Coleoptera, Adephaga) of America, north of Mexico. ZooKeys, (245), 1-1722.

Centers for Disease Control and Prevention. (2015). *Geographic distribution of ticks that bite humans*. Retrieved from http://www.cdc.gov/ticks/geographic_distribution.html

Darsie Jr., R. F., and R. A. Ward. 2005. Identification and geographical distribution of the mosquitoes of North America, North of Mexico. University Press of Florida, Gainesville.

7 REFERENCES

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, *PE&RS*, Vol. 77(9):858-864.

National Water Quality Assessment Program (NAWQA): Mobile River Basin Study. 2013, January 15. USGS. <http://al.water.usgs.gov/nawqa/mobl/basin.html>.

USDA, NRCS. 2016. The PLANTS Database (<http://plants.usda.gov>, 1 August 2016). National Plant Data Team, Greensboro, NC 27401-4901 USA.

8 APPENDIX A: DATA PRODUCT NUMBERS

For more information on the sampling protocols and the latest observatory data visit <http://data.neonscience.org/data-product-catalog> and search by name or code number.

Table 40: NEON data product names and descriptions.

Name	Description	Identification Code
Root sampling (megapit)	Fine root biomass in 10cm increments (first 1m depth) and 20cm increments (from 1m to 2m depth) from soil pit sampling	NEON.DOM.SITE.DP1.10066
Soil physical properties (Megapit)	Soil taxonomy, horizon names, horizon depths, as well as soil bulk density, porosity, texture (sand, silt, and clay content) in the <= 2 mm soil fraction for each soil horizon. Data were derived from a sampling location expected to be representative of the area where the Instrumented Soil Plots per site are located and were collected once during site construction. Also see distributed soil data products.	NEON.DOM.SITE.DP1.00096
Soil chemical properties (Megapit)	Total content of a range of chemical elements, pH, and electrical conductivity in the <= 2 mm soil fraction for each soil horizon. Data were derived from a sampling location expected to be representative of the area where the Instrumented Soil Plots per site are located and were collected once during site construction. Also see distributed soil data products.	NEON.DOM.SITE.DP1.00097

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Name	Description	Identification Code
Woody plant vegetation structure	Structure measurements, including height, canopy diameter, and stem diameter, as well as mapped position of individual woody plants	NEON.DOM.SITE.DP1.10098
Plant presence and percent cover	Plant species presence as observed in multi-scale plots: species and associated percent cover at 1-m ² and plant species presence at 10-m ² , 100-m ² and 400-m ²	NEON.DOM.SITE.DP1.10058
Plant phenology observations	Phenophase status and intensity of tagged plants	NEON.DOM.SITE.DP1.10055
Plant foliar stable isotopes	Field collection metadata describing the sampling of sun-lit canopy foliar tissues for stable isotope compositions. Also includes raw data returned from the laboratory.	NEON.DOM.SITE.DP1.10053
Plant foliar physical and chemical properties	Plant sun-lit canopy foliar physical (e.g., leaf mass per area) and chemical properties reported at the level of the individual.	NEON.DOM.SITE.DP1.10026
Non-herbaceous perennial vegetation structure	Field measurements of individual non-herbaceous perennial plants (e.g. cacti, ferns)	NEON.DOM.SITE.DP1.10045.
Ground beetles sampled from pitfall traps	Taxonomically identified ground beetles and the plots and times from which they were collected.	NEON.DOM.SITE.DP1.10022
Ground beetle sequences DNA barcode	CO1 DNA sequences from select ground beetles	NEON.DOM.SITE.DP1.10020
Mosquitoes sampled from CO ₂ traps	Taxonomically identified mosquitoes and the plots and times from which they were collected	NEON.DOM.SITE.DP1.10043
Mosquito-borne pathogen status	Presence/absence of a pathogen in a single mosquito sample (pool)	NEON.DOM.SITE.DP1.10041
Mosquito sequences DNA barcode	CO1 DNA sequences from select mosquitoes	NEON.DOM.SITE.DP1.10038
Ticks sampled using drag cloths	Abundance and density of ticks collected by drag and/or flag sampling (by species and/or lifestage)	NEON.DOM.SITE.DP1.10093
Tick-borne pathogen status	Presence/absence of a pathogen in each single tick sample	NEON.DOM.SITE.DP1.10092