TOS SITE CHARACTERIZATION REPORT: DOMAIN 01

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See configuration management system for approval history.

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CHANGE RECORD

REVISION	DATE	ECO#	DESCRIPTION OF CHANGE
A	10/21/2016	ECO-04186	Initial Release
B	12/05/2018	ECO-05647	• 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 two sites in the Northeast 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

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.011027	TIS Site Characterization Report
RD[05]	NEON.DOC.001588	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 01 OVERVIEW: NORTHEAST DOMAIN

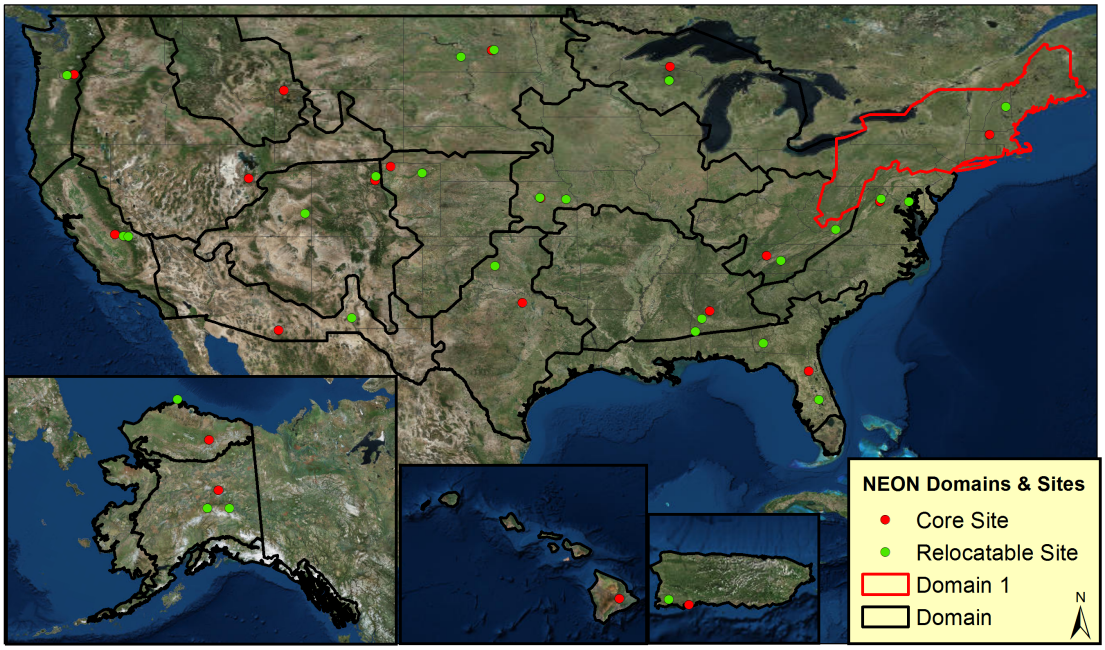

Figure 1: NEON project map with Domain 01 highlighted in red.

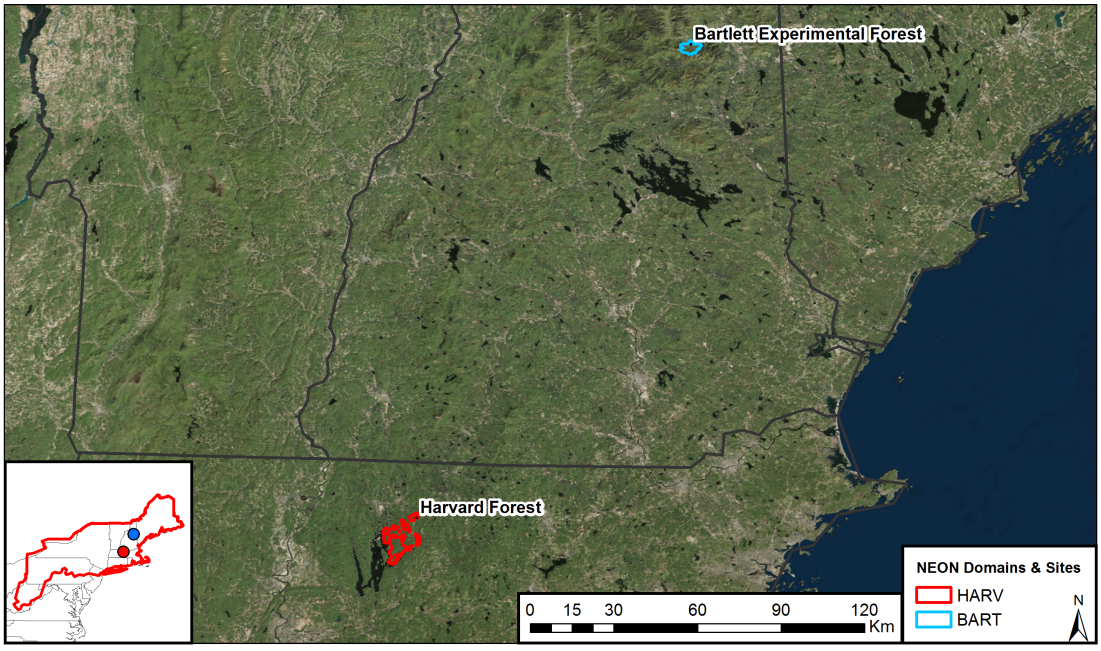

Figure 2: Site boundaries within Domain 01.

- States included in the domain: Connecticut, Maine, Massachusetts, New Jersey, New Hampshire, New York, Ohio, Rhode Island, Vermont, Virginia, West Virginia
- Core site: Harvard Forest (HARV)
- Relocatable 1: Bartlett Experimental Forest (BART)
- Science themes: Climate Change

4 CORE SITE- HARVARD FORSET (HARV)

The NEON Harvard Forest site includes land managed by two distinct entities: the Harvard Forest managed by Harvard University and the Harvard Forest Long Term Ecological Research (LTER) program (15.2 km^2) and the Quabbin Reservoir Watershed managed by the Massachusetts Department of Conservation and Recreation (33.8 km^2).

Representative habitats at the NEON site include northern, transition, and central forests; marshes, swamps, conifer-dominated bogs, and forest plantations. Regionally, HARV represents a typical rural/ wildland, allowing NEON to scale to larger spheres of influence, and the site anchors an urban to rural gradient from suburban areas outside Boston to the wildlands throughout New England, Maine and New Hampshire. Typical of the region, the forest is second-growth due to agricultural clearing and logging throughout the 1800s, and due to the Great New England Hurricane of 1938 that flattened large swaths of forest both at the site and throughout New England. Today, nearly 90% of Harvard Forest is closed-canopy (Site Characteristics, 2011).

Figure 3: Phenocamera image for HARV. 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: Harvard Forest -Harvard University, LTER and Quabbin Reservoir Watershed - Department of Conservation and Recreation- Division of Water Supply Protection

- Located in: Worcester County, Massachusetts
- Sampling Area: 40.4 km^2
- Plot Elevation: 160-382m
- Dominant vegetation type: The vegetation is typical of the Transition Hardwoods-White Pine Hemlock region. The dominant vegetation is regenerating Eastern Deciduous temperate forest comprised of red oak (*Quercus rubra*), red maple (*Acer rubrum*), and white pine (*Pinus strobus*) (Site Characteristics, 2011). Typical of the region, the forest is second-growth due to agricultural clearing and logging throughout the 1800s, and due to the Great New England Hurricane of 1938 that flattened large swaths of forest both at the site and throughout New England.Harvard Forest lies at the current northern range limit of the hemlock woolly adelgid (*Adelges tsugae*), an aphid-like insect that is killing eastern hemlock (*Tsuga canadensis*) across its range.
- General management: Since its inception in 1907, research and education have been the focus of Harvard Forest. The original purpose was to develop a field laboratory for students, a research center in forestry and related disciplines, and a demonstration of practical sustained forestry. Since 1988, Harvard Forest has been a Long-Term Ecological Research site, funded by the National Science Foundation to conduct integrated, long-term studies of forest dynamics.
- The Lower Hop Brook (HOPB) aquatic site is located west of HARV. 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 (see next section for more detail).

4.1 TOS Spatial Sampling Design

TOS Distributed Plots were allocated at HARV 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.

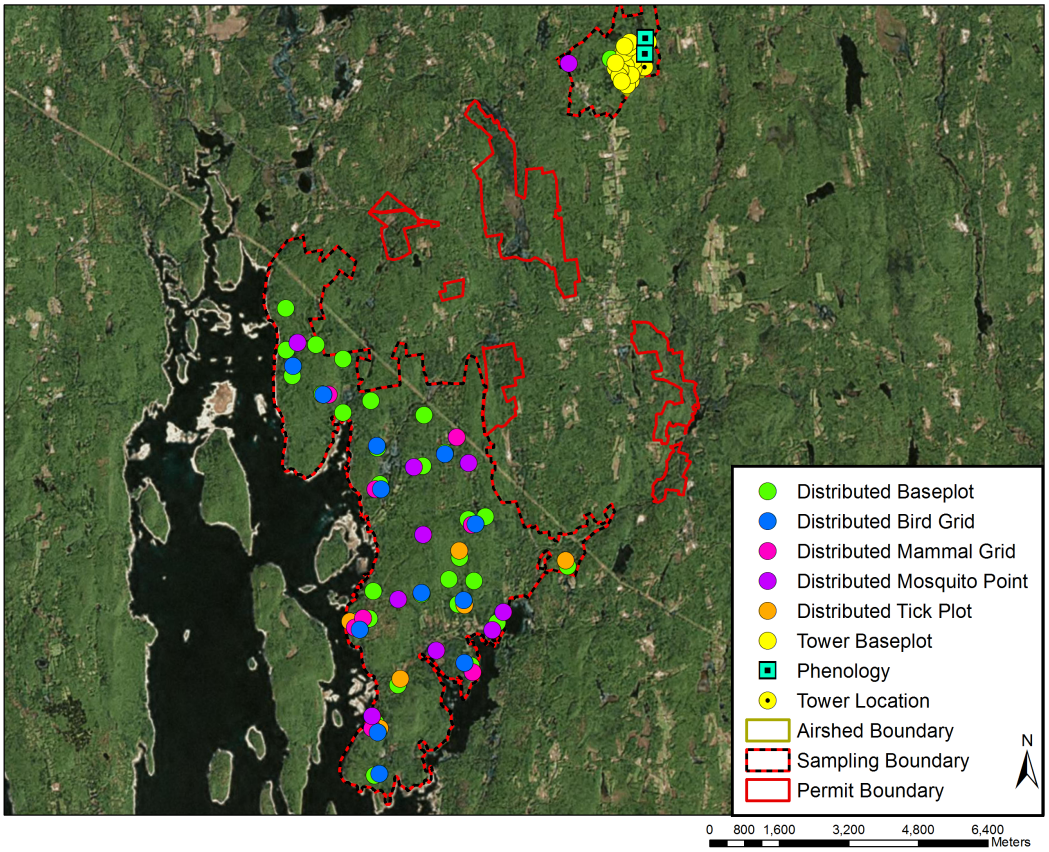

Figure 4: Map of TOS plot centroids within the NEON TOS sampling boundary at HARV.

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

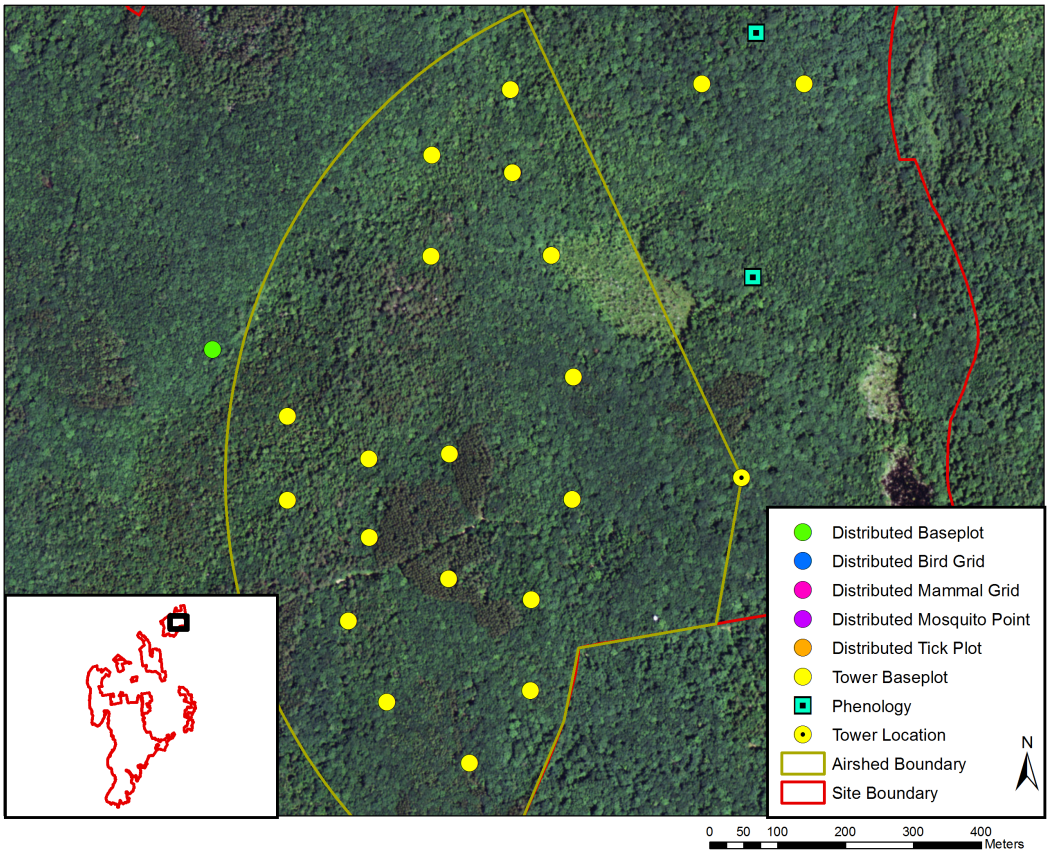

Figure 5: Map of the tower airshed and TOS plot centroids at HARV.

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 HARV.

NLCD Class	Site Area (km^2)	Percent (%)
Deciduous Forest	16.16	40.61
Evergreen Forest	11.12	27.94
Mixed Forest	7.12	17.89
Woody Wetlands	2.23	5.6
Developed Open Space	1.4	3.52
Shrub Scrub	0.55	1.37
Open Water	0.47	1.19
Emergent Herbaceous Wetlands	0.36	0.91
Pasture Hay	0.28	0.69
Developed Low Intensity	0.05	0.12
Grassland Herbaceous	0.04	0.11
Cultivated Crops	0.01	0.03

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 HARV.

Plot Type	Plot Subtype	NLCD Class	Number of Plots Established
Distributed	Base Plot	Deciduous Forest	10
Distributed	Base Plot	Evergreen Forest	9
Distributed	Base Plot	Mixed Forest	7
Distributed	Base Plot	Woody Wetlands	4
Distributed	Bird Grid	Deciduous Forest	4
Distributed	Bird Grid	Evergreen Forest	3
Distributed	Bird Grid	Mixed Forest	2
Distributed	Bird Grid	Woody Wetlands	1
Distributed	Mammal Grid	Deciduous Forest	3
Distributed	Mammal Grid	Evergreen Forest	2
Distributed	Mammal Grid	Mixed Forest	1
Distributed	Mosquito Point	Deciduous Forest	4
Distributed	Mosquito Point	Evergreen Forest	3
Distributed	Mosquito Point	Mixed Forest	2
Distributed	Mosquito Point	Woody Wetlands	1

Plot Type	Plot Subtype	NLCD Class	Number of Plots Established
Distributed	Tick Plot	Deciduous Forest	3
Distributed	Tick Plot	Evergreen Forest	2
Distributed	Tick Plot	Mixed Forest	1
Tower	Base Plot	NA	20
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 include: mixed forest, evergreen forest, and deciduous forest.

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

Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Deciduous Forest	Beetles	5
Distributed	Base Plot	Evergreen Forest	Beetles	3
Distributed	Base Plot	Mixed Forest	Beetles	2
Distributed	Base Plot	Deciduous Forest	Canopy Foliage Chemistry	4
Distributed	Base Plot	Evergreen Forest	Canopy Foliage Chemistry	3
Distributed	Base Plot	Mixed Forest	Canopy Foliage Chemistry	2
Distributed	Base Plot	Woody Wetlands	Canopy Foliage Chemistry	1
Distributed	Base Plot	Deciduous Forest	Coarse Downed Wood	7
Distributed	Base Plot	Evergreen Forest	Coarse Downed Wood	6
Distributed	Base Plot	Mixed Forest	Coarse Downed Wood	4
Distributed	Base Plot	Woody Wetlands	Coarse Downed Wood	3
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	6
Distributed	Base Plot	Mixed Forest	Digital Hemispherical Photos for Leaf Area Index	4
Distributed	Base Plot	Woody Wetlands	Digital Hemispherical Photos for Leaf Area Index	3
Distributed	Base Plot	Deciduous Forest	Herbaceous Biomass	7
Distributed	Base Plot	Evergreen Forest	Herbaceous Biomass	6
Distributed	Base Plot	Mixed Forest	Herbaceous Biomass	4
Distributed	Base Plot	Woody Wetlands	Herbaceous Biomass	3
Distributed	Base Plot	Deciduous Forest	Plant Diversity	10

Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Evergreen Forest	Plant Diversity	9
Distributed	Base Plot	Mixed Forest	Plant Diversity	7
Distributed	Base Plot	Woody Wetlands	Plant Diversity	4
Distributed	Base Plot	Deciduous Forest	Soil Biogeochemistry	3
Distributed	Base Plot	Evergreen Forest	Soil Biogeochemistry	2
Distributed	Base Plot	Mixed Forest	Soil Biogeochemistry	1
Distributed	Base Plot	Deciduous Forest	Soil Microbes	3
Distributed	Base Plot	Evergreen Forest	Soil Microbes	2
Distributed	Base Plot	Mixed Forest	Soil Microbes	1
Distributed	Base Plot	Deciduous Forest	Vegetation Structure	9
Distributed	Base Plot	Evergreen Forest	Vegetation Structure	6
Distributed	Base Plot	Mixed Forest	Vegetation Structure	4
Distributed	Base Plot	Woody Wetlands	Vegetation Structure	3

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 HARV.

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 the total TOS Tower Base Plot number.

4.2 Sampling Season Characterization: HARV

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.

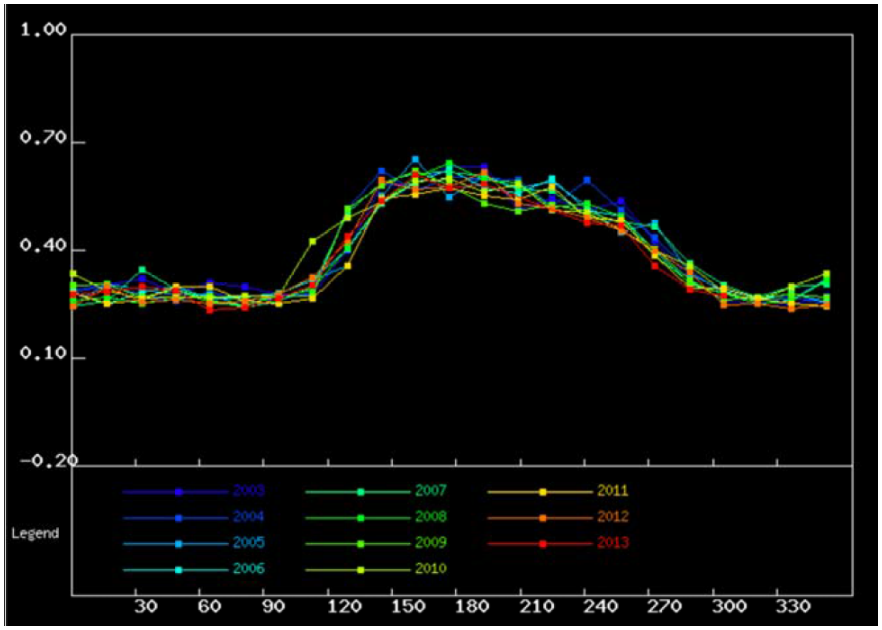

Figure 6: MODIS-EVI greenness (y-axis = EVI ratio) as a function of time (x-axis = DOY) for the years 2003-2013 at the NEON HARV site.

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

Average Increase	Average Maximum	Average Decrease	Average Minimum
110 (04/21)	160 (06/10)	220 (08/09)	300 (10/28)

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: 40.25 km x 40.25 km box, Latitude: 42.5369, Longitude: -72.17266

4.3 Belowground Biomass

4.3.1 Site-Specific Methods

Belowground biomass characterization data were collected down to a depth of 130 cm by NEON staff in July 2012. 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 ($\leq$ 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 HARV.

Latitude	Longitude	Soil Family	Soil Order
42.53562	-72.17562	Coarse-loamy over sandy or sandy-skeletal - mixed - semiactive - frigid Oxyaquic Dystrudepts	Inceptisol

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

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

Upper Depth	Lower Depth	Mean (mg per cm^3)	Std Dev
0	10	6.74	1.87
10	20	3.65	0.85
20	30	1.85	0.48
30	40	2.23	1.58
40	50	2.94	3.92
50	60	0.39	0.45
60	70	0.41	0.36
70	80	0.1	0.09
80	90	0.01	0.01
90	100	0	0
100	110	0	0
110	120	0.06	0.11

Upper Depth	Lower Depth	Mean (mg per cm^3)	Std Dev
120	130	0.19	0.32

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

Upper Depth	Lower Depth	Mean Cumulative (g per m^2)	Cumulative Std Dev
0	10	673.68	187.16
10	20	1038.85	212
20	30	1224.14	181.26
30	40	1446.93	146.4
40	50	1740.82	441.08
50	60	1779.89	451.61
60	70	1820.45	484.3
70	80	1830.45	493.57
80	90	1831.22	493.55
90	100	1831.22	493.55
100	110	1831.22	493.55
110	120	1837.45	493.53
120	130	1856.02	494.85

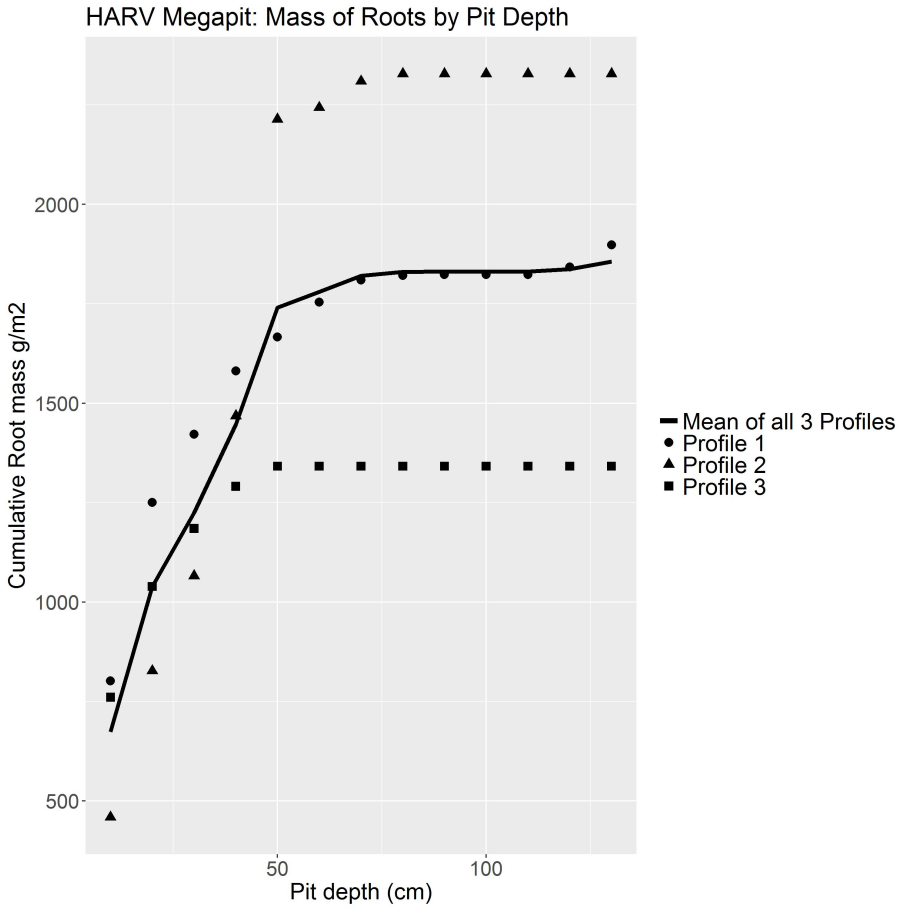

Figure 7: Cumulative root mass by pit depth at HARV.

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

Total Pit Depth (cm)	130
Total Mean Cumulative Mass at 30cm (g per m^2)	1224.14
Total Mean Cumulative Mass at 100cm (g per m^2)	1831.22
Total Mean Cumulative Mass (g per m^2)	1856.02

4.4 Plant Characterization and Phenology Species Selection

4.4.1 Site-Specific Methods

Plant characterization data were collected by an external contractor during July 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.

4.4.2 Results

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

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area (m^2 per m^2)	Mean ABH (cm^2 per m^2)
OSCI	*Osmunda cinnamomea* L.	1	6	NA	NA
MEVI	*Medeola virginiana* L.	10	1	NA	NA
VAAN	*Vaccinium angustifolium* Aiton	11	1	NA	NA
PIMA	*Picea mariana* (Mill.) Britton, Sterns & Poggenb.	12	NA	NA	1.97
MIRE	*Mitchella repens* L.	13	<1	NA	NA
GAPR2	*Gaultheria procumbens* L.	14	<1	NA	NA
KALA	*Kalmia latifolia* L.	15	<1	NA	<1
UVSE	*Uvularia sessilifolia* L.	16	<1	NA	NA
TRBO2	*Trientalis borealis* Raf.	17	<1	NA	NA
COTR2	*Coptis trifolia* (L.) Salisb.	18	<1	NA	NA
THNO	*Thelypteris noveboracensis* (L.) Nieuwl.	19	<1	NA	NA
QURU	*Quercus rubra* L.	2	NA	NA	10.88
BEAL2	*Betula alleghaniensis* Britton	20	NA	NA	0.85

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area (m^2 per m^2)	Mean ABH (cm^2 per m^2)
QUVE	*Quercus velutina* Lam.	21	NA	NA	0.68
FAGR	*Fagus grandifolia* Ehrh.	22	<1	NA	0.51
BELE	*Betula lenta* L.	23	<1	NA	0.53
DRCA11	*Dryopteris carthusiana* (Vill.) H.P. Fuchs	24	<1	NA	NA
NYSY	*Nyssa sylvatica* Marshall	25	NA	NA	0.54
CLBO3	*Clintonia borealis* (Aiton) Raf.	26	<1	NA	NA
VACO	*Vaccinium corymbosum* L.	27	<1	NA	<1
PIAB	*Picea abies* (L.) Karst.	28	NA	NA	0.41
LYOB	*Lycopodium obscurum* L.	29	<1	NA	NA
TSCA	*Tsuga canadensis* (L.) Carriére	3	<1	NA	7.59
ACPE	*Acer pensylvanicum* L.	30	<1	NA	0.01
BEPA	*Betula papyrifera* Marshall	31	NA	NA	0.29
VILA11	*Viburnum lantanoides* Michx.	32	<1	NA	<1
DRCA3	*Dryopteris campyloptera* Clarkson	33	<1	NA	NA
QUERC	*Quercus* sp.	34	<1	NA	NA
VINUC	*Viburnum nudum* L. var. *cassinoides* (L.) Torr. & A. Gray	35	<1	NA	NA
FRAM2	*Fraxinus americana* L.	36	NA	NA	0.16
RHPR	*Rhododendron prinophyllum* (Small) Millais	37	<1	NA	NA
EPRE2	*Epigaea repens* L.	38	<1	NA	NA
PTAQ	*Pteridium aquilinum* (L.) Kuhn	38	<1	NA	NA
ACRU	*Acer rubrum* L.	4	<1	NA	6.67
PRSE2	*Prunus serotina* Ehrh.	40	<1	NA	0.01
ILVE	*Ilex verticillata* (L.) A. Gray	41	<1	NA	<1
ARTR	*Arisaema triphyllum* (L.) Schott	42	<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)
BEPO	*Betula populifolia* Marshall	42	<1	NA	NA
LIBE3	*Lindera benzoin* (L.) Blume	42	<1	NA	NA
AMELA	*Amelanchier* sp.	45	<1	NA	NA
ILLA	*Ilex laevigata* (Pursh) A. Gray	45	<1	NA	NA
VIDE	*Viburnum dentatum* L.	45	<1	NA	NA
QUAL	*Quercus alba* L.	48	NA	NA	0.06
DRCR4	*Dryopteris cristata* (L.) A. Gray	49	<1	NA	NA
LYAN2	*Lycopodium annotinum* L.	49	<1	NA	NA
THPA	*Thelypteris palustris* Schott	49	<1	NA	NA
DEPU2	*Dennstaedtia punctilobula* (Michx.) T. Moore	5	2	NA	NA
CELAS	*Celastrus* sp.	52	<1	NA	NA
DRMA4	*Dryopteris marginalis* (L.) A. Gray	52	<1	NA	NA
MOUN3	*Monotropa uniflora* L.	52	<1	NA	NA
TRUN	*Trillium undulatum* Willd.	52	<1	NA	NA
PIGL	*Picea glauca* (Moench) Voss	56	NA	NA	0.03
POGR4	*Populus grandidentata* Michx.	57	NA	NA	0.03
LYTR	*Lycopodium tristachyum* Pursh	59	<1	NA	NA
OCAC	*Oclemena acuminata* (Michx.) Greene	59	<1	NA	NA
RUHI	*Rubus hispidus* L.	59	<1	NA	NA
PIST	*Pinus strobus* L.	6	<1	NA	3.32
ACSA3	*Acer saccharum* Marshall	62	NA	NA	0.02
BETUL	*Betula* sp.	63	<1	NA	NA
CADE5	*Carex debilis* Michx.	63	<1	NA	NA
CAREX	*Carex* sp.	63	<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)
CASW	*Carex swanii* (Fernald) Mack.	63	<1	NA	NA
CATR10	*Carex trisperma* Dewey	63	<1	NA	NA
COCA13	*Cornus canadensis* L.	63	<1	NA	NA
EUDI16	*Eurybia divaricata* (L.) G.L. Nesom	63	<1	NA	NA
RUPU	*Rubus pubescens* Raf.	63	<1	NA	NA
SPAL2	*Spiraea alba* Du Roi	63	<1	NA	NA
TRER3	*Trillium erectum* L.	63	<1	NA	NA
PIRE	*Pinus resinosa* Aiton	7	NA	NA	3.41
CADE12	*Castanea dentata* (Marshall) Borkh.	74	NA	NA	0.01
HAVI4	*Hamamelis virginiana* L.	75	NA	NA	0.01
OSVI	*Ostrya virginiana* (Mill.) K. Koch	76	NA	NA	0.01
VINU	*Viburnum nudum* L.	77	NA	NA	<1
KAAN	*Kalmia angustifolia* L.	78	NA	NA	<1
AMLA	*Amelanchier laevis* Wiegand	79	NA	NA	<1
ARNU2	*Aralia nudicaulis* L.	8	1	NA	NA
MACA4	*Maianthemum canadense* Desf.	9	1	NA	NA

Note:Taxon IDs and scientific names are based on the USDA Plants database (plants.usda.gov). *Carex* sp. likely includes *C. pensylvanica*. Individuals recorded as *Picea mariana* were likely misidentified *Picea rubens*.

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

Plot ID	Species Richness	Shannon Diversity Index	Percent Total Herbaceous Cover	Bryophyte Percent Cover
HARV_033	13	1.26	49	2.31
HARV_034	15	1.55	105	3.56
HARV_035	5	0.34	30	0.31
HARV_036	17	2.14	50	1.19
HARV_037	15	1.85	77	2.5

Plot ID	Species Richness	Shannon Diversity Index	Percent Total Herbaceous Cover	Bryophyte Percent Cover
HARV_038	10	1.78	23	4.75
HARV_039	15	1.86	26	0.88
HARV_040	25	2.29	78	28.88
HARV_041	13	1.83	15	4
HARV_042	13	1.49	34	3.12
HARV_043	9	0.9	10	0.69
HARV_044	20	1.99	80	16.75
HARV_045	14	1.84	40	0.62
HARV_046	14	1.77	63	62.88
HARV_047	13	1.68	39	0.43
HARV_048	14	1.43	37	3.12
HARV_049	14	0.92	76	2.06
HARV_050	10	1.24	27	3.19
HARV_051	13	1.16	40	1.25
HARV_052	3	0	0	5.25
Bryophyte Mean				5.77

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.

4.5 Beetles

4.5.1 Site-Specific Methods

Beetle site characterization was conducted in June and July 2010 by NEON staff following the standard methods outlined in TOS Site Characterization Methods (RD[6]). Beetle site characterization data was collected to start site level teaching collections. 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 trap locations at HARV.

Trap ID	Lat	Long
1	42.526	-72.183
2	42.527	-72.183
3	42.529	-72.184
4	42.531	-72.189
5	42.535	-72.183
6	42.538	-72.186
7	42.544	-72.176

Note: Trap locations were recorded to only three decimal places, thus introducing mapping error. No sampling occurred outside of the permitted boundary.

Table 13: Beetle identification results at HARV.

Sample ID	Scientific Name	Collection Date	Trap Location
NEONTcarabid1715	*Chlaenius emarginatus*	7/12/2010	1
NEONTcarabid1831	*Chlaenius emarginatus*	7/26/2010	1
NEONTcarabid1728	*Myas cyanescens*	7/12/2010	1
NEONTcarabid1749	*Poecilus lucublandus*	7/5/2010	1
NEONTcarabid1830	*Chlaenius emarginatus*	7/26/2010	1
NEONTcarabid1741	*Syntomus americanus*	7/12/2010	1
NEONTcarabid1666	*Notiophilus aeneus*	7/5/2010	1
NEONTcarabid1738	*Syntomus americanus*	7/5/2010	1
NEONTcarabid1832	*Carabus nemoralis*	7/26/2010	1
NEONTcarabid1740	*Syntomus americanus*	7/12/2010	1
NEONTcarabid1699	*Poecilus lucublandus*	7/5/2010	1
NEONTcarabid1664	*Harpalus faunus*	7/5/2010	1
NEONTcarabid1824	*Harpalus pensylvanicus*	7/19/2010	1
NEONTcarabid1712	*Chlaenius emarginatus*	7/12/2010	1
NEONTcarabid1667	*Agonoleptus conjunctus*	7/5/2010	1
NEONTcarabid1785	*Carabus nemoralis*	7/19/2010	1
NEONTcarabid1833	*Chlaenius emarginatus*	7/19/2010	1
NEONTcarabid1784	*Myas cyanescens*	7/26/2010	2
NEONTcarabid1745	*Pterostichus pensylvanicus*	7/12/2010	2
NEONTcarabid1726	*Myas cyanescens*	7/5/2010	2

Sample ID	Scientific Name	Collection Date	Trap Location
NEONTcarabid1713	*Chlaenius emarginatus*	7/5/2010	2
NEONTcarabid1714	*Chlaenius emarginatus*	7/5/2010	2
NEONTcarabid1818	*Chlaenius emarginatus*	7/19/2010	2
NEONTcarabid1758	*Agonum retractum*	7/19/2010	2
NEONTcarabid1725	*Amara lunicollis*	7/5/2010	2
NEONTcarabid1710	*Chlaenius emarginatus*	7/12/2010	2
NEONTcarabid1727	*Myas cyanescens*	7/5/2010	2
NEONTcarabid1797	*Agonum gratiosum*	7/19/2010	3
NEONTcarabid1826	*Agonum gratiosum*	7/26/2010	3
NEONTcarabid1733	*Agonum retractum*	6/28/2010	3
NEONTcarabid1735	*Agonum gratiosum*	7/19/2010	3
NEONTcarabid1711	*Chlaenius emarginatus*	7/26/2010	3
NEONTcarabid1707	*Sphaeroderus canadensis*	7/5/2010	3
NEONTcarabid1827	*Agonum mutatum*	7/26/2010	3
NEONTcarabid1730	*Agonum retractum*	6/21/2010	3
NEONTcarabid1819	*Agonum gratiosum*	7/26/2010	3
NEONTcarabid1736	*Agonum gratiosum*	7/19/2010	3
NEONTcarabid1665	*Brachinus fulminatus*	7/5/2010	3
NEONTcarabid1823	*Agonum gratiosum*	7/26/2010	3
NEONTcarabid1731	*Agonum retractum*	6/21/2010	3
NEONTcarabid1828	*Agonum gratiosum*	7/26/2010	3
NEONTcarabid1829	*Agonum gratiosum*	7/26/2010	3
NEONTcarabid1825	*Agonum mutatum*	7/26/2010	3
NEONTcarabid1820	*Agonum mutatum*	7/26/2010	3
NEONTcarabid1788	*Trechus apicalis*	7/19/2010	3
NEONTcarabid1683	*Pterostichus rostratus*	6/28/2010	3
NEONTcarabid1706	*Sphaeroderus canadensis*	7/12/2010	3
NEONTcarabid1632	*Agonum mutatum*	7/19/2010	3
NEONTcarabid1762	*Agonum retractum*	7/19/2010	4
NEONTcarabid1747	*Poecilus lucublandus*	7/12/2010	4
NEONTcarabid1722	*Amara lunicollis*	6/21/2010	4
NEONTcarabid1721	*Amara lunicollis*	6/21/2010	4
NEONTcarabid1716	*Nipponoserica peregrina*	7/5/2010	4
NEONTcarabid1746	*Poecilus lucublandus*	7/12/2010	4

Sample ID	Scientific Name	Collection Date	Trap Location
NEONTcarabid1724	*Amara lunicollis*	6/28/2010	4
NEONTcarabid1698	*Poecilus lucublandus*	6/21/2010	4
NEONTcarabid1739	*Syntomus americanus*	6/28/2010	4
NEONTcarabid1732	*Agonum retractum*	6/21/2010	4
NEONTcarabid1719	*Nipponoserica peregrina*	7/12/2010	4
NEONTcarabid1748	*Poecilus lucublandus*	7/12/2010	4
NEONTcarabid1760	*Carabus nemoralis*	7/19/2010	4
NEONTcarabid1792	*Agonum retractum*	7/26/2010	4
NEONTcarabid1761	*Cymindis cribricollis*	7/19/2010	4
NEONTcarabid1720	*Amara lunicollis*	6/21/2010	4
NEONTcarabid1709	*Sphaeroderus stenostomus*	7/19/2010	4
NEONTcarabid1708	*Sphaeroderus stenostomus*	7/12/2010	4
NEONTcarabid1717	*Nipponoserica peregrina*	6/14/2010	4
NEONTcarabid1718	*Nipponoserica peregrina*	6/14/2010	4
NEONTcarabid1809	*Syntomus americanus*	7/26/2010	4
NEONTcarabid1672	*Pterostichus rostratus*	6/21/2010	5
NEONTcarabid1802	*Cymindis neglecta*	7/26/2010	5
NEONTcarabid1661	*Cymindis neglecta*	7/19/2010	5
NEONTcarabid1807	*Synuchus impunctatus*	7/26/2010	5
NEONTcarabid1662	*Cymindis neglecta*	7/12/2010	5
NEONTcarabid1729	*Cymindis cribricollis*	6/21/2010	5
NEONTcarabid1744	*Pterostichus pensylvanicus*	6/8/2010	6
NEONTcarabid1705	*Sphaeroderus canadensis*	6/28/2010	7
NEONTcarabid1704	*Sphaeroderus canadensis*	6/28/2010	7

4.6 Mosquitoes

4.6.1 Site-Specific Methods

Mosquito site characterization was conducted in June and July 2010 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. 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.

4.6.2 Results

Table 14: Mosquito trap locations at HARV.

Trap ID	Lat	Long
1	42.526	-72.183
2	42.527	-72.183
3	42.529	-72.184
4	42.531	-72.189
5	42.535	-72.183
6	42.538	-72.186
7	42.544	-72.176

Note: Trap locations were recorded to only three decimal places, thus introducing mapping error. No sampling occurred outside of the permitted boundary.

Table 15: Mosquito identification results at HARV.

Sample ID	Scientific Name	Collection Date	Trap Location
NEONTculicid1556	*Culex restuans*	7/20/2010	1
NEONTculicid1547	*Coquillettidia perturbans*	7/13/2010	1
NEONTculicid2090	*Culiseta melanura*	7/21/2010	1
NEONTculicid1548	*Culex territans*	7/13/2010	1
NEONTculicid1570	*Aedes canadensis*	7/28/2010	1
NEONTculicid1555	*Culiseta melanura*	7/20/2010	1
NEONTculicid2081	*Culiseta morsitans*	7/27/2010	1
NEONTculicid2089	*Culiseta melanura*	7/21/2010	1
NEONTculicid2087	*Culiseta melanura*	7/21/2010	1
NEONTculicid2082	*Culiseta morsitans*	7/27/2010	1
NEONTculicid1557	*Aedes vexans*	7/20/2010	1
NEONTculicid2063	*Anopheles punctipennis*	7/14/2010	1
NEONTculicid1552	*Culiseta impatiens*	7/14/2010	1
NEONTculicid1569	*Culiseta morsitans*	7/28/2010	1
NEONTculicid1562	*Culex restuans*	7/27/2010	1
NEONTculicid1549	*Anopheles punctipennis*	7/13/2010	1
NEONTculicid1563	*Aedes cinereus*	7/27/2010	1
NEONTculicid1553	*Aedes excrucians*	7/14/2010	1

Sample ID	Scientific Name	Collection Date	Trap Location
NEONTculicid1546	*Coquillettidia perturbans*	7/13/2010	1
NEONTculicid2064	*Anopheles punctipennis*	7/20/2010	1
NEONTculicid2091	*Culiseta melanura*	7/21/2010	1
NEONTculicid1571	*Culex territans*	7/28/2010	2
NEONTculicid1542	*Coquillettidia perturbans*	7/7/2010	2
NEONTculicid2075	*Culex territans*	7/7/2010	2
NEONTculicid2096	*Culiseta melanura*	7/21/2010	2
NEONTculicid1541	*Coquillettidia perturbans*	7/7/2010	2
NEONTculicid1572	*Culex territans*	7/28/2010	2
NEONTculicid1574	*Aedes canadensis*	7/28/2010	2
NEONTculicid2077	*Culex territans*	7/7/2010	2
NEONTculicid1560	*Culiseta melanura*	7/21/2010	2
NEONTculicid1573	*Culiseta morsitans*	7/28/2010	2
NEONTculicid2095	*Culiseta melanura*	7/21/2010	2
NEONTculicid2074	*Culex territans*	7/7/2010	2
NEONTculicid1561	*Culex territans*	7/21/2010	2
NEONTculicid1559	*Aedes canadensis*	7/20/2010	2
NEONTculicid2076	*Culex territans*	7/7/2010	2
NEONTculicid1537	*Culex salinarius*	6/30/2010	3
NEONTculicid1554	*Aedes cinereus*	7/20/2010	3
NEONTculicid1888	*Culiseta melanura*	6/29/2010	3
NEONTculicid1566	*Culiseta morsitans*	7/28/2010	3
NEONTculicid2078	*Culex territans*	6/16/2010	3
NEONTculicid2085	*Culiseta morsitans*	7/27/2010	3
NEONTculicid2093	*Culiseta melanura*	7/27/2010	3
NEONTculicid1886	*Culiseta melanura*	6/29/2010	3
NEONTculicid1887	*Culiseta melanura*	6/29/2010	3
NEONTculicid2067	*Culex restuans*	6/15/2010	3
NEONTculicid1543	*Aedes canadensis*	7/13/2010	3
NEONTculicid1885	*Culiseta melanura*	6/29/2010	3
NEONTculicid2066	*Culex restuans*	6/15/2010	3
NEONTculicid1544	*Aedes canadensis*	7/13/2010	3
NEONTculicid1883	*Culiseta melanura*	6/29/2010	3
NEONTculicid1515	*Culex salinarius*	6/8/2010	3

Sample ID	Scientific Name	Collection Date	Trap Location
NEONTculicid1884	*Culiseta melanura*	6/29/2010	3
NEONTculicid1891	*Culiseta melanura*	6/29/2010	4
NEONTculicid1901	*Culiseta melanura*	6/29/2010	4
NEONTculicid2046	*Aedes excrucians*	6/9/2010	4
NEONTculicid1871	*Culiseta melanura*	6/22/2010	4
NEONTculicid2086	*Culiseta morsitans*	7/28/2010	4
NEONTculicid1900	*Culiseta melanura*	6/29/2010	4
NEONTculicid1527	*Aedes aurifer*	6/16/2010	4
NEONTculicid2079	*Culex territans*	6/16/2010	4
NEONTculicid1873	*Culiseta melanura*	6/22/2010	4
NEONTculicid1568	*Aedes triseriatus*	7/28/2010	4
NEONTculicid2059	*Aedes triseriatus*	7/21/2010	4
NEONTculicid1877	*Culiseta melanura*	6/22/2010	4
NEONTculicid2057	*Aedes triseriatus*	7/20/2010	4
NEONTculicid1879	*Culiseta melanura*	6/23/2010	4
NEONTculicid1893	*Culiseta melanura*	6/29/2010	4
NEONTculicid1525	*Coquillettidia perturbans*	6/16/2010	4
NEONTculicid1551	*Aedes japonicus*	7/14/2010	4
NEONTculicid2084	*Culiseta morsitans*	7/27/2010	4
NEONTculicid2058	*Aedes triseriatus*	7/20/2010	4
NEONTculicid2044	*Culex salinarius*	7/6/2010	4
NEONTculicid2045	*Aedes excrucians*	6/9/2010	4
NEONTculicid1874	*Culiseta melanura*	6/22/2010	4
NEONTculicid1876	*Culiseta melanura*	6/22/2010	4
NEONTculicid1895	*Culiseta melanura*	6/29/2010	4
NEONTculicid1534	*Culex salinarius*	6/22/2010	4
NEONTculicid1878	*Culiseta melanura*	6/23/2010	4
NEONTculicid2080	*Culex territans*	6/16/2010	4
NEONTculicid1875	*Culiseta melanura*	6/22/2010	4
NEONTculicid1894	*Culiseta melanura*	6/29/2010	4
NEONTculicid1882	*Culiseta melanura*	6/23/2010	4
NEONTculicid1870	*Culiseta melanura*	6/22/2010	4
NEONTculicid1528	*Aedes cinereus*	6/16/2010	4
NEONTculicid2060	*Aedes triseriatus*	7/27/2010	4

Sample ID	Scientific Name	Collection Date	Trap Location
NEONTculicid1880	*Culiseta melanura*	6/23/2010	4
NEONTculicid1892	*Culiseta melanura*	6/29/2010	4
NEONTculicid1898	*Culiseta melanura*	6/29/2010	4
NEONTculicid1872	*Culiseta melanura*	6/22/2010	4
NEONTculicid1897	*Culiseta melanura*	6/29/2010	4
NEONTculicid1890	*Culiseta melanura*	6/29/2010	4
NEONTculicid1899	*Culiseta melanura*	6/29/2010	4
NEONTculicid1889	*Culiseta melanura*	6/29/2010	4
NEONTculicid1896	*Culiseta melanura*	6/29/2010	4
NEONTculicid1881	*Culiseta melanura*	6/23/2010	4
NEONTculicid1565	*Aedes canadensis*	7/28/2010	5
NEONTculicid2065	*Anopheles punctipennis*	7/27/2010	5
NEONTculicid1521	*Coquillettidia perturbans*	6/16/2010	5
NEONTculicid1536	*Anopheles punctipennis*	6/30/2010	5
NEONTculicid1531	*Aedes canadensis*	6/22/2010	6
NEONTculicid2049	*Aedes excrucians*	6/22/2010	6
NEONTculicid2050	*Aedes excrucians*	6/22/2010	6
NEONTculicid2061	*Aedes vexans*	6/23/2010	6
NEONTculicid1538	*Culex salinarius*	6/30/2010	6
NEONTculicid2043	*Aedes cinereus*	6/9/2010	6
NEONTculicid2047	*Aedes excrucians*	6/22/2010	6
NEONTculicid1532	*Aedes canadensis*	6/22/2010	6
NEONTculicid1533	*Aedes excrucians*	6/22/2010	6
NEONTculicid2048	*Aedes excrucians*	6/22/2010	6
NEONTculicid2054	*Aedes japonicus*	6/30/2010	7
NEONTculicid2051	*Aedes japonicus*	6/30/2010	7
NEONTculicid1516	*Coquillettidia perturbans*	6/9/2010	7
NEONTculicid1517	*Coquillettidia perturbans*	6/9/2010	7
NEONTculicid2056	*Aedes japonicus*	6/30/2010	7
NEONTculicid2052	*Aedes japonicus*	6/30/2010	7
NEONTculicid2068	*Culex restuans*	6/9/2010	7
NEONTculicid2055	*Aedes japonicus*	6/30/2010	7
NEONTculicid1535	*Aedes japonicus*	6/29/2010	7
NEONTculicid2053	*Aedes japonicus*	6/30/2010	7

4.7 Ticks

4.7.1 Site-Specific Methods

There was no tick site characterization work done at Harvard Forest. For more information on this protocol and data product numbers, see Appendix A.

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.

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.

Motzkin G, Wilson P. 2003. Bryophyte Species at Harvard Forest 1994. Harvard Forest Data Archive: HF057.

Motzkin G. 2003. Vascular Plant Species at Harvard Forest 1992. Harvard Forest Data Archive: HF056.

Site Characterisitics.(2011) Harvard Forest. Retrieved from http://harvardforest.fas.harvard.edu/research/HF-tract

5 RELOCATABLE SITE 1- BARTLETT EXPERIMENTAL FOREST (BART)

The Bartlett Experimental Forest is an actively researched section of the White Mountain National Forest in New Hampshire. The site's soils, elevational gradient, climate, and tree species composition are typical for many forest areas throughout New England (Stone, 2006). Bartlett Experimental Forest also represents the most Northeastern NEON site, and anchors the top of the north-south nitrogen deposition gradient along the eastern-side of the US.

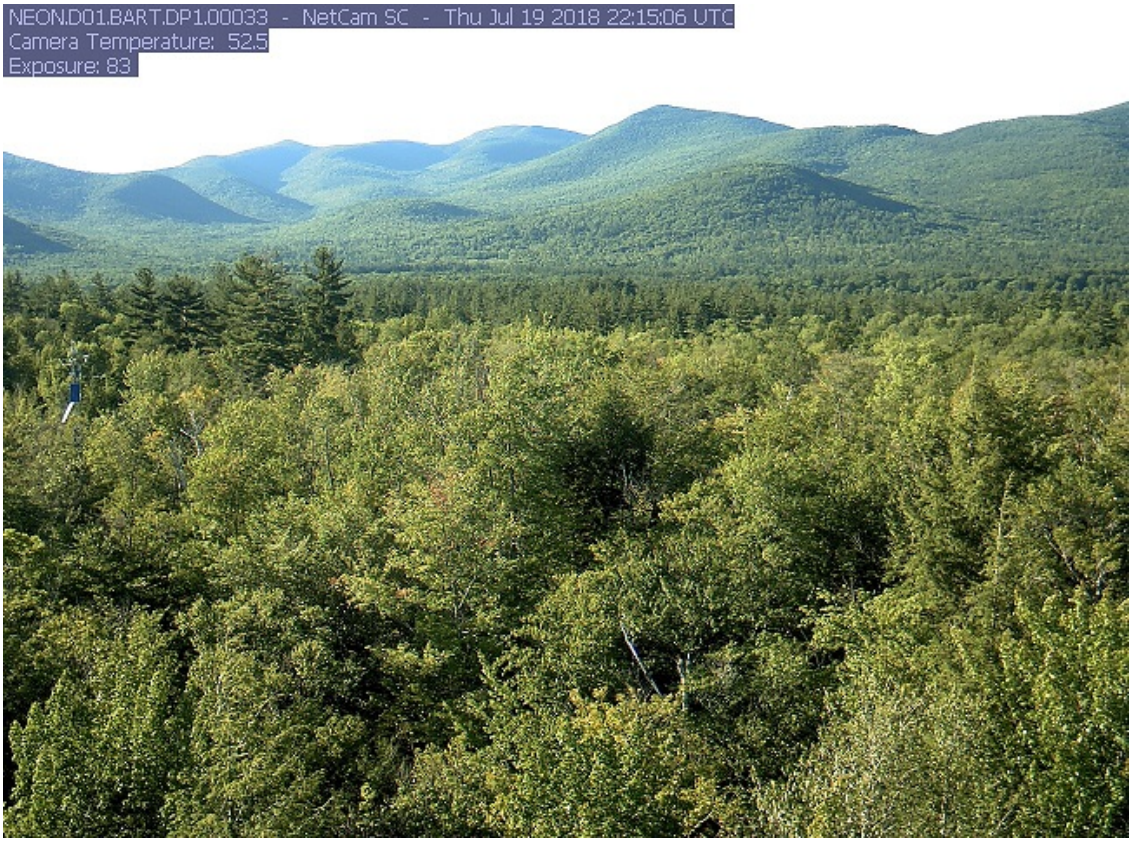

Figure 8: Phenocamera image for BART. The phenocamera is located at the top of the NEON tower and faces north. Phenocamera images are available at https://phenocam.sr.unh.edu/webcam/network/table/.

Key Characteristics:

- Site host: U.S. Forest Service
- Located in: Carroll County, New Hampshire
- Sampling Area: 15.66 km^2
- Plot Elevation: 232-629m
- Dominant vegetation type: The Bartlett site is primarily Eastern Deciduous along a boreal ecotone. The primary forest cover type is sugar maple (*Acer saccharum*), beech (*Fagus* sp.), and yellow birch (*Betula alleghaniensis*). The upper elevations support stands of spruce (*Picea rubens*) and fir (*Abies balsamea*). Softwoods such as hemlock (*Tsuga canadensis*), balsam fir (*Abies balsamea*) and spruce are commonly

mixed with hardwoods, especially on cool steep slopes or on the poorly drained soils at lower elevations. Although white pine (*Pinus strobus*) occurs mostly in stands at lower elevations, scattered specimens can be found over a large part of the forest. The site provides the deciduous-to-boreal forest transitional ecotone towards the ecosystems in the North (Stone, 2006).

- General management: The Bartlett forest has a history of logging dating from colonial times through the beginning of the 20th century. Approximately 70% of the land area has remained uncut since the early 1900s. Natural disturbances include late 19th century fire, beech scale-Nectria complex (beech bark disease) beginning in the 1940s, severe wind disturbance resulting from hurricanes in 1938 and 1954, and a damaging ice storm in 1998 (Stone, 2006).
- 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 BART 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.

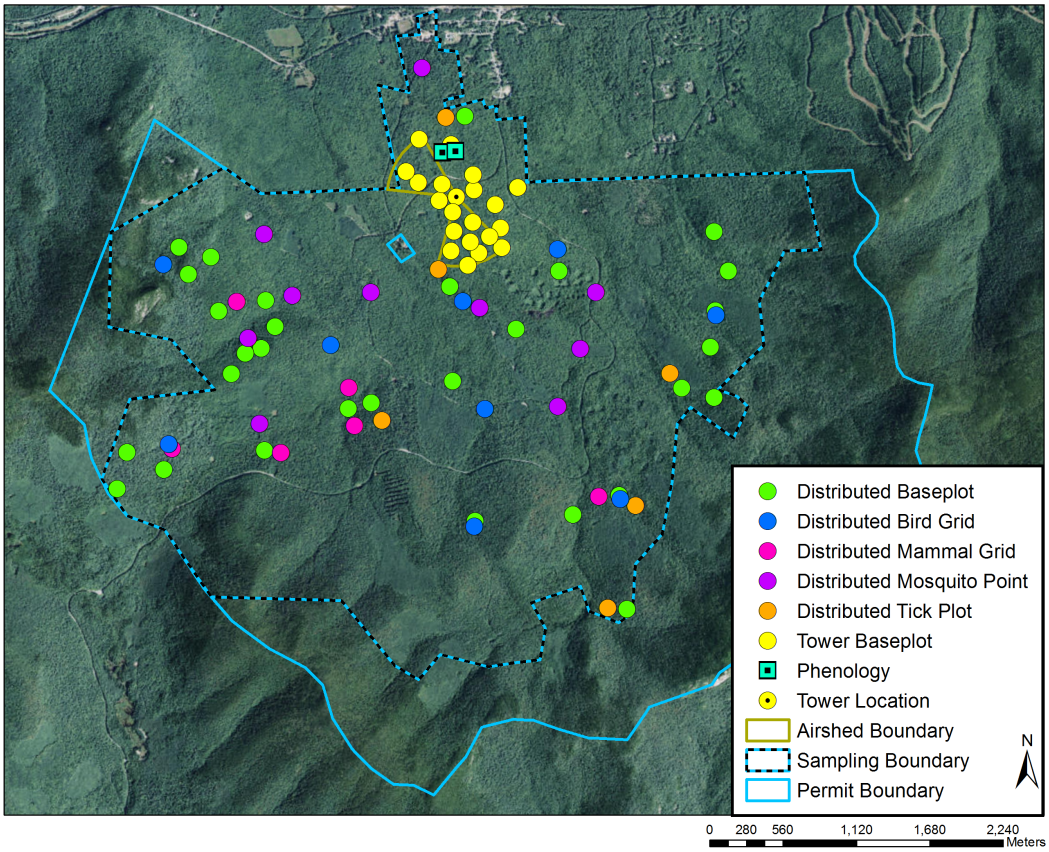

Figure 9: Map of TOS plot centroids within the NEON TOS sampling boundary at BART.

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

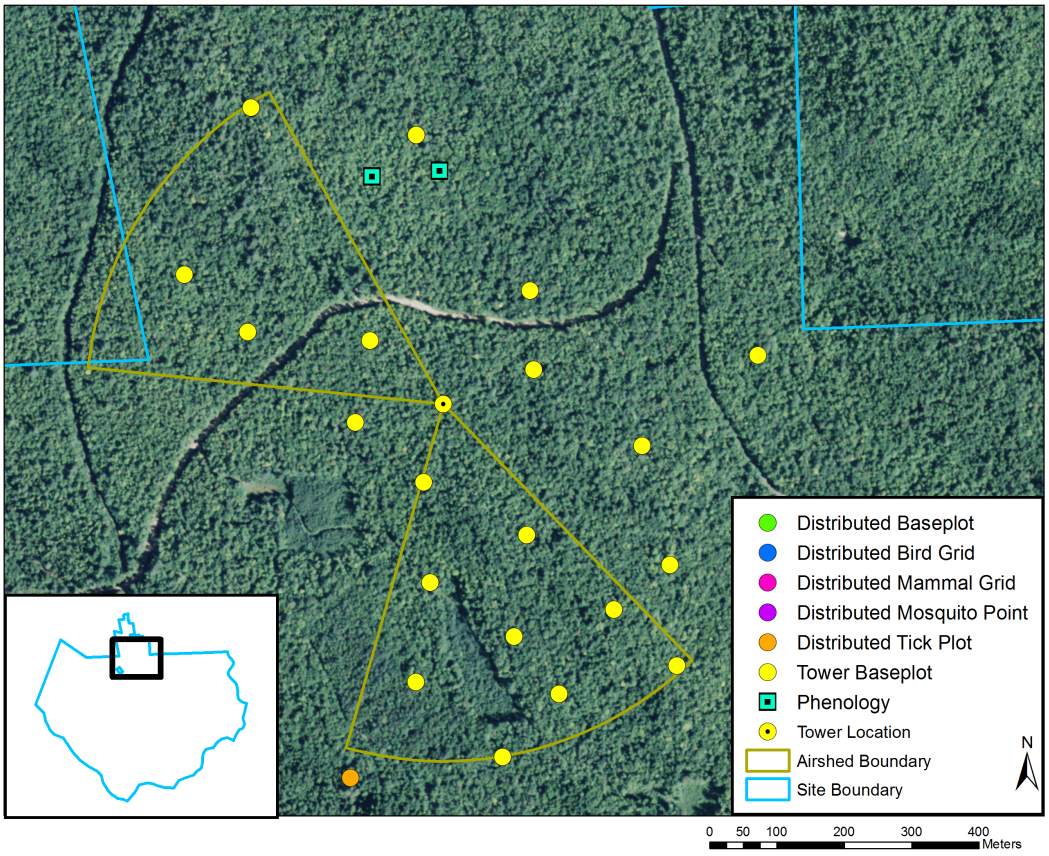

Figure 10: Map of the tower airshed and TOS plot centroids at BART.

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

Table 16: NLCD land cover classes and area within the TOS site boundary at BART.

NLCD Class	Site Area (km^2)	Percent (%)
Mixed Forest	7.84	50.19
Deciduous Forest	5.5	35.22
Evergreen Forest	1.86	11.92
Developed Open Space	0.22	1.43
Shrub Scrub	0.09	0.6
Grassland Herbaceous	0.05	0.33
Woody Wetlands	0.03	0.18
Developed Low Intensity	0.02	0.13

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 17: NLCD land cover classes and TOS plot numbers at BART.

Plot Type	Plot Subtype	NLCD Class	Number of Plots Established
Distributed	Base Plot	Deciduous Forest	9
Distributed	Base Plot	Evergreen Forest	9
Distributed	Base Plot	Mixed Forest	12
Distributed	Bird Grid	Deciduous Forest	3
Distributed	Bird Grid	Evergreen Forest	2
Distributed	Bird Grid	Mixed Forest	4
Distributed	Mammal Grid	Deciduous Forest	2
Distributed	Mammal Grid	Evergreen Forest	1
Distributed	Mammal Grid	Mixed Forest	3
Distributed	Mosquito Point	Deciduous Forest	3
Distributed	Mosquito Point	Evergreen Forest	3
Distributed	Mosquito Point	Mixed Forest	4
Distributed	Tick Plot	Deciduous Forest	2
Distributed	Tick Plot	Evergreen Forest	1
Distributed	Tick Plot	Mixed Forest	3
Tower	Base Plot	NA	20
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 include: deciduous forest and mixed forest.

Table 18: Number of Distributed Base plots per NLCD land cover class per protocol at BART.

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

Plot Type	Plot Subtype	NLCD Class	Protocols	Number of Plots
Distributed	Base Plot	Mixed Forest	Coarse Downed Wood	8
Distributed	Base Plot	Deciduous Forest	Digital Hemispherical Photos for Leaf Area Index	6
Distributed	Base Plot	Evergreen Forest	Digital Hemispherical Photos for Leaf Area Index	6
Distributed	Base Plot	Mixed Forest	Digital Hemispherical Photos for Leaf Area Index	8
Distributed	Base Plot	Deciduous Forest	Herbaceous Biomass	6
Distributed	Base Plot	Evergreen Forest	Herbaceous Biomass	6
Distributed	Base Plot	Mixed Forest	Herbaceous Biomass	8
Distributed	Base Plot	Deciduous Forest	Plant Diversity	9
Distributed	Base Plot	Evergreen Forest	Plant Diversity	9
Distributed	Base Plot	Mixed Forest	Plant Diversity	12
Distributed	Base Plot	Deciduous Forest	Soil Biogeochemistry	2
Distributed	Base Plot	Evergreen Forest	Soil Biogeochemistry	1
Distributed	Base Plot	Mixed Forest	Soil Biogeochemistry	3
Distributed	Base Plot	Deciduous Forest	Soil Microbes	2
Distributed	Base Plot	Evergreen Forest	Soil Microbes	1
Distributed	Base Plot	Mixed Forest	Soil Microbes	3
Distributed	Base Plot	Deciduous Forest	Vegetation Structure	6
Distributed	Base Plot	Evergreen Forest	Vegetation Structure	6
Distributed	Base Plot	Mixed Forest	Vegetation Structure	9

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 19: Number of Tower Plots per protocol at BART.

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

Plot Type	Plot Subtype	Protocols	Number of Plots
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: BART

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.

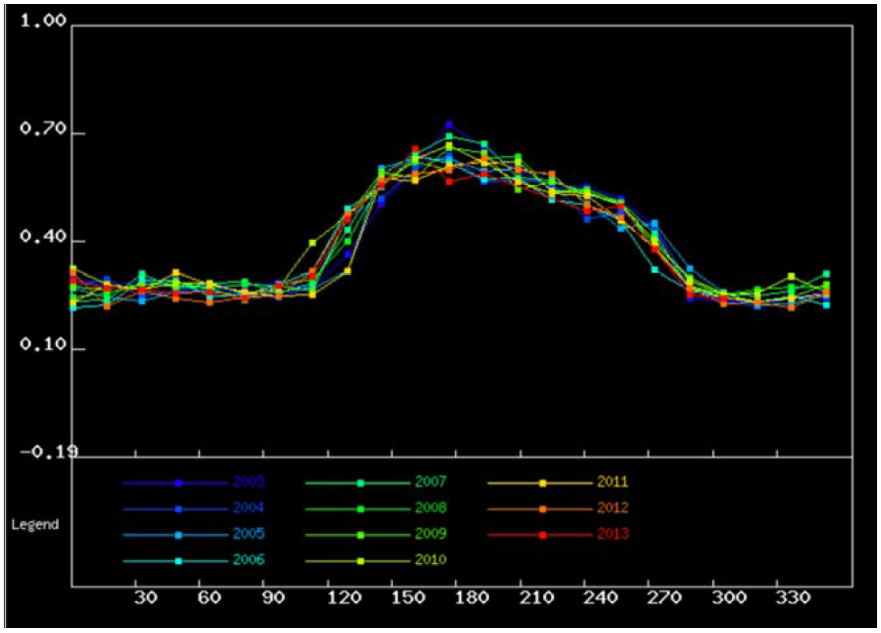

Figure 11: MODIS-EVI greenness (y-axis = EVI ratio) as a function of time (x-axis = DOY) for the years 2003-2013 at the NEON BART site.

Table 20: Average MODIS-EVI greenness dates for the NEON BART site, based on data from 2003-2013 (DOY, with MM/DD in parentheses).

Average Increase	Average Maximum	Average Decrease	Average Minimum
120 (05/01)	170 (06/20)	220 (08/09)	300 (10/28)

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: 34.25 km x 34.25 km box, centroid lat: 40.177819, centroid long: -112.4524 (WGS84 datum)

5.3 Belowground Biomass

5.3.1 Site-Specific Methods

Belowground biomass characterization data were collected down to a depth of 160 cm by NEON staff in August 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 ($\leq$ 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 21: Soil Pit Information at BART.

Latitude	Longitude	Soil Family	Soil Order
44.06516	-71.28834	Coarse-loamy - isotic - frigid Aquic Haplorthods	Spodosol

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

Table 22: Fine root mass per depth increment (cm) at BART.

Upper Depth	Lower Depth	Mean (mg per cm^3)	Std Dev
0	10	11.12	5.25
10	20	7.49	0.21
20	30	5.14	4.9
30	40	0.83	0.55
40	50	0.26	0.13
50	60	0.12	0.07
60	70	0.18	0.09
70	80	0.38	0.39
80	90	0.1	0.14
90	100	0.21	0.19
100	120	0.05	0.06
120	140	0	0
140	160	0	0.01

Table 23: Cumulative fine root mass as a function of depth (cm) at BART.

Upper Depth	Lower Depth	Mean Cumulative (g per m^2)	Cumulative Std Dev
0	10	1111.66	525.02
10	20	1860.66	526.11
20	30	2374.34	528.15
30	40	2457.78	548.85
40	50	2483.63	556.12
50	60	2495.91	562.28
60	70	2513.51	571.04
70	80	2551.36	588.96
80	90	2561.25	593.45
90	100	2582.53	594.84
100	120	2592.58	582.14
120	140	2593.13	582.47
140	160	2594.09	580.91

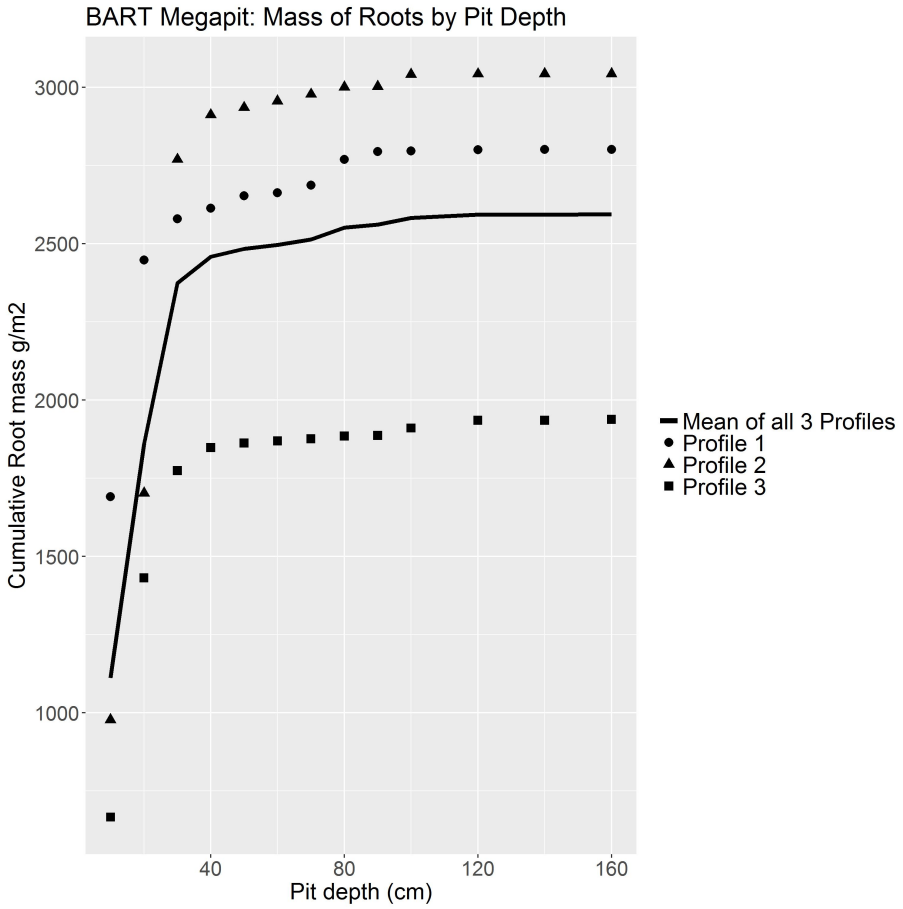

Figure 12: Cumulative root mass by pit depth at BART.

Table 24: Fine root biomass sampling summary data at BART.

Total Pit Depth (cm)	160
Total Mean Cumulative Mass at 30cm (g per m^2)	2374.34
Total Mean Cumulative Mass at 100cm (g per m^2)	2582.53
Total Mean Cumulative Mass (g per m^2)	2594.09

5.4 Plant Characterization and Phenology Species Selection

5.4.1 Site-Specific Methods

Plant characterization data were collected by an external contractor during August 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. .

5.4.2 Results

Table 25: Site plant characterization and phenology species summary at BART.

Taxon ID	Scientific Name	Rank	Mean Percent Cover	Mean Canopy Area (m^2 per m^2)	Mean ABH (cm^2 per m^2)
FAGR	*Fagus grandifolia* Ehrh.	1	40	NA	0.88
DRIN5	*Dryopteris intermedia* (Muhl. ex Willd.) A. Gray	10	1	NA	NA
PIST	*Pinus strobus* L.	11	<1	NA	0.45
BEPAP	*Betula papyrifera* Marshall var. *papyrifera*	12	NA	NA	0.37
BEPA	*Betula papyrifera* Marshall	13	<1	NA	0.3
BEPAC2	*Betula papyrifera* Marshall var. *cordifolia* (Regel) Fernald	14	NA	NA	0.23
ACSA3	*Acer saccharum* Marshall	15	<1	NA	NA
HAVI4	*Hamamelis virginiana* L.	16	<1	NA	<1
ABBA	*Abies balsamea* (L.) Mill.	17	<1	NA	0.05
POTR5	*Populus tremuloides* Michx.	18	NA	NA	0.17
MEVI	*Medeola virginiana* L.	19	<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)
TSCA	*Tsuga canadensis* (L.) Carriére	2	5	0.02	7.89
TACA7	*Taxus canadensis* Marshall	20	<1	NA	NA
TIAM	*Tilia americana* L.	21	<1	NA	0.07
PIRE	*Pinus resinosa* Aiton	22	<1	NA	0.08
POPUL	*Populus* sp.	23	NA	NA	0.06
OSCL2	*Osmunda claytoniana* L.	24	<1	NA	NA
DEPU2	*Dennstaedtia punctilobula* (Michx.) T. Moore	25	<1	NA	NA
BETUL	*Betula* sp.	26	NA	NA	0.05
MIRE	*Mitchella repens* L.	27	<1	NA	NA
MACA4	*Maianthemum canadense* Desf.	28	<1	NA	NA
FRNI	*Fraxinus nigra* Marshall	29	<1	NA	0.01
ACRU	*Acer rubrum* L.	3	<1	0.01	7.9
POGR4	*Populus grandidentata* Michx.	30	NA	NA	0.05
RUPU	*Rubus pubescens* Raf.	31	<1	NA	NA
ATFI	*Athyrium filix-femina* (L.) Roth	32	<1	NA	NA
TRUN	*Trillium undulatum* Willd.	33	<1	NA	NA
QURU	*Quercus rubra* L.	34	<1	NA	0.03
UVSE	*Uvularia sessilifolia* L.	35	<1	NA	NA
ARNU2	*Aralia nudicaulis* L.	36	<1	NA	NA
TRBO2	*Trientalis borealis* Raf.	37	<1	NA	NA
PRSE2	*Prunus serotina* Ehrh.	38	<1	NA	NA
MOUN3	*Monotropa uniflora* L.	39	<1	NA	NA
OXMO	*Oxalis montana* Raf.	39	<1	NA	NA
BEAL2	*Betula alleghaniensis* Britton	4	2	NA	2.55
CLBO3	*Clintonia borealis* (Aiton) Raf.	41	<1	NA	NA
LYOB	*Lycopodium obscurum* L.	41	<1	NA	NA
PYEL	*Pyrola elliptica* Nutt.	41	<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)
OSVI	*Ostrya virginiana* (Mill.) K. Koch	44	NA	NA	0.02
GAPR2	*Gaultheria procumbens* L.	45	<1	NA	NA
HULU2	*Huperzia lucidula* (Michx.) Trevis.	46	<1	NA	NA
VICU	*Viola cucullata* Aiton	46	<1	NA	NA
DARE	*Dalibarda repens* L.	48	<1	NA	NA
LYAN2	*Lycopodium annotinum* L.	49	<1	NA	NA
FRAM2	*Fraxinus americana* L.	5	<1	NA	1.48
PTAQ	*Pteridium aquilinum* (L.) Kuhn	50	<1	NA	NA
RUOC	*Rubus occidentalis* L.	50	<1	NA	NA
THNO	*Thelypteris noveboracensis* (L.) Nieuwl.	50	<1	NA	NA
ACSP2	*Acer spicatum* Lam.	53	<1	NA	NA
COTR2	*Coptis trifolia* (L.) Salisb.	53	<1	NA	NA
EPVI2	*Epifagus virginiana* (L.) W.P.C. Barton	53	<1	NA	NA
CHUM	*Chimaphila umbellata* (L.) W.P.C. Barton	57	<1	NA	NA
LYCL	*Lycopodium clavatum* L.	57	<1	NA	NA
TICO	*Tiarella cordifolia* L.	57	<1	NA	NA
VEVI	*Veratrum viride* Aiton	57	<1	NA	NA
VINU	*Viburnum nudum* L.	57	<1	NA	NA
ACSAS	*Acer saccharum* Marshall var. *saccharum*	6	NA	NA	1.22
ILVE	*Ilex verticillata* (L.) A. Gray	62	<1	NA	NA
ARTR	*Arisaema triphyllum* (L.) Schott	63	<1	NA	NA
CIAL	*Circaea alpina* L.	63	<1	NA	NA
GOTE	*Goodyera tesselata* Lodd.	63	<1	NA	NA
LYCO3	*Lycopodium complanatum* L.	63	<1	NA	NA
MARA7	*Maianthemum racemosum* (L.) Link	63	<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)
OCAC	*Oclemena acuminata* (Michx.) Greene	63	<1	NA	NA
PIRU	*Picea rubens* Sarg.	7	2	<1	0.36
BIDEN	*Bidens* sp.	70	<1	NA	NA
CYAC3	*Cypripedium acaule* Aiton	70	<1	NA	NA
LOCA7	*Lonicera canadensis* W. Bartram ex Marshall	70	<1	NA	NA
LYUN	*Lycopus uniflorus* Michx.	70	<1	NA	NA
OSCI	*Osmunda cinnamomea* L.	70	<1	NA	NA
ULAM	*Ulmus americana* L.	70	<1	NA	NA
AMELA	*Amelanchier* sp.	79	<1	NA	NA
ACPE	*Acer pensylvanicum* L.	8	2	NA	0.05
ACSA3	*Acer saccharum Marshall* Acer saccharum Marshall	80	<1	NA	NA
ATFIA	*Athyrium filix-femina* (L.) Roth ssp. *angustum* (Willd.) R.T. Clausen	81	NA	NA	NA
FRAXI	*Fraxinus* sp.	81	NA	NA	NA
FRPE	*Fraxinus pennsylvanica* Marshall	81	NA	NA	NA
ONSE	*Onoclea sensibilis* L.	81	NA	NA	NA
OSCIC	*Osmunda cinnamomea* L. var. *cinnamomea*	81	NA	NA	NA
PINACE	Pinaceae sp.	81	NA	NA	NA
VILA11	*Viburnum lantanoides* Michx.	9	2	NA	NA

Note: Taxon IDs and scientific names are based on the USDA Plants database (plants.usda.gov).

Table 26: Per plot breakdown of species richness, diversity, and herbaceous cover at BART.

Plot ID	Species Richness	Shannon Diversity Index	Percent Total Herbaceous Cover
1099	18	2.02	39
2763	34	2.89	78
2891	13	2.5	15

Plot ID	Species Richness	Shannon Diversity Index	Percent Total Herbaceous Cover
4091	16	2.77	16
587	15	2.32	35
8011	15	2.69	16
BART_032	19	2.93	20
BART_033	9	2.2	9
BART_034	6	1.79	6
BART_036	7	1.52	13
BART_037	6	1.71	8
BART_039	12	1.77	29
BART_040	22	2.74	31
BART_041	6	1.64	8
BART_042	15	2.3	24
BART_044	4	1.1	8
BART_046	9	1.95	15
BART_047	29	3.03	49
BART_050	19	2.21	48
BART_051	9	2.02	14

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 BART Tower Base Plots.

5.5 Beetles

5.5.1 Site-Specific Methods

Beetle site characterization was conducted June 2013 by NEON staff following the standard methods outlined in TOS Site Characterization Methods (RD[6]). Beetle site characterization data was collected to start site level teaching collections. 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 27: Beetle identification results at BART.

Sample ID	Scientific Name	Sex
NEONTcarabid8099	*Cymindis cribricollis*	m
NEONTcarabid8100	*Notiophilus aeneus*	m
NEONTcarabid8102	*Platynus decentis*	m
NEONTcarabid8092	*Pterostichus coracinus*	f
NEONTcarabid8093	*Pterostichus coracinus*	m
NEONTcarabid8095	*Pterostichus coracinus*	m
NEONTcarabid8096	*Pterostichus coracinus*	f
NEONTcarabid8097	*Pterostichus coracinus*	f
NEONTcarabid8098	*Pterostichus coracinus*	f
NEONTcarabid8104	*Pterostichus coracinus*	f
NEONTcarabid8101	*Pterostichus pensylvanicus*	f
NEONTcarabid8103	*Pterostichus pensylvanicus*	f
NEONTcarabid8094	*Pterostichus rostratus*	m

5.6 Mosquitoes

5.6.1 Site-Specific Methods

Mosquito site characterization was conducted 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.For more information on this protocol and data product numbers see Appendix A.

5.6.2 Results

Table 28: Mosquito identification results at BART.

Sample ID	Scientific Name	Count
BART.June2013.SC.1	*Aedes canadensis canadensis*	116
BART.June2013.SC.1	*Aedes communis*	122
BART.June2013.SC.1	*Aedes excrucians*	33
BART.June2013.SC.1	*Aedes vexans*	2
BART.June2013.SC.1	*Aedes* spp.	11
BART.June2013.SC.1	*Aedes* spp.	6

Sample ID	Scientific Name	Count
BART.June2013.SC.1	*Coquilllettidia perturbans*	10

5.7 Ticks

5.7.1 Site-Specific Methods

Tick drags were conducted at BART in June of 2013 to test protocol methods and calculate capture rates. No tick identification or pathogen testing was performed. For more information on this protocol and data product numbers see Appendix A.

5.7.2 Results

Table 29: Tick identification results at BART.

Scientific Name	Number of Males	Number of Females
Dermacentor variabilis	4	6
Ixodes scapularis	0	3

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 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.

Filip, S.M., Little, E.L. Jr. 1971. Trees and shrubs of the Bartlett Experimental Forest, Carroll County, New Hampshire. Res. Paper NE-211. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 20 p.

Stone, T. (2006, August 4). Bartlett Experimental Forest. https://www.fs.fed.us/ne/durham/4155/bartlett.htm

6 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.

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

7 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 30: 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
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-m2 and plant species presence at 10-m2, 100-m2 and 400-m2	NEON.DOM.SITE.DP1.10058
Plant phenology observations	Phenophase status and intensity of tagged plants	NEON.DOM.SITE.DP1.10055

Name	Description	Identification Code
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 CO2traps	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