



FACT SHEET:

NEON – National Ecological Observatory Network

NEON = a continental-scale observatory made up of a collection of sites scattered across the United States that each gather a wide assortment of comparable ecological data in a standardized way. When the data are compiled it will provide a good overall picture of the ecological health of the country.

Overview: In an era of dramatic changes in land use and other human activities, we must understand how the biosphere – the living part of the earth – is changing in response to human activities.

Humans depend upon air, water, food, fiber, and fuel – all produced by the biosphere. Disruptions of the supply of these necessary services could alter the quality of life in many part of the world.

NEON will help develop a “larger-picture” view of how the biosphere’s products (food, air, water, fiber, fuel) are interlinked with human impacts.

Purpose:

NEON is a continental-scale observatory funded by the National Science Foundation (NSF) to measure the causes and effects of ecological changes on U.S. ecosystems. NEON provides freely available data, educational resources and scientific infrastructure for research.

NEON will collect data necessary to answer critical questions about:

- Impacts of climate change
- Impacts of land-use change
- Invasive species ecology

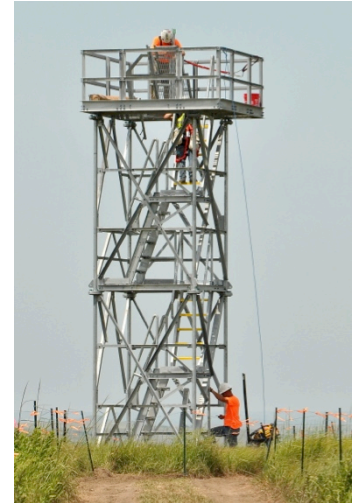
Description: The NEON observatory consists of standardized equipment and sampling locations spread across 20 eco-climatic domains (Appendix 1.) within the United States, each of which represents different regions of vegetation, landforms, climate, and ecosystem performance.

Within each of these 20 domains NEON will construct (from 2012 – 2017) both **permanent/core sites** and **relocatable terrestrial sites** and **aquatic sites** to collect a broad array of ecological information. The sites will include a tower constructed to hold much of the collection equipment, as

well as other sensors and distributed areas for sampling selected biota. Data collection will run from 2017 – 2046.

At Konza – Konza is the core site for the Prairie Peninsula Domain, and will include a permanent site near the southeast corner of the Godwin Hill trail (tower), a relocatable site (tower) in the field along the road into Konza, and an aquatic site along Kings Creek north of the restoration experiments.

By standardizing and consolidating the data collected from these 20 domains we will have a **continental-scale ecological observatory**.



Konza core tower – during construction 2014

Categories of data collected at each site:

- **Organisms:** organisms will be sampled and measured as indicators or “sentinels” of change in areas referred to as NEON Fundamental Sentinel Units (FSUs). These FSUs will provide data on:
 - *Microorganisms*
 - *Mosquitoes*
 - *Ground beetles*
 - *Deer mice*
 - *Fish*
 - *Birds*
 - *Plants*
 - *Aquatic Invertebrates*
 - *Biodiversity*
 - *Population dynamics*
 - *Phenology*
 - *Infectious disease*
 - *Biogeochemistry* (cycling of nutrients in the soil, water & air)
 - *Microbial diversity and function*
 - *Ecohydrology*

- **Atmosphere, Soil & Water:** properties and movement will be measured using sensors networks at and near the tower and aquatic sites. Because these measurements are fundamental to our understanding of continental-scale ecology, we refer to them as the NEON Fundamental Instrument Units (FIUs). The FIUs will provide data on:
 - *Weather and environmental conditions*
 - *Fluxes between the ecosystem and the atmosphere* – because chemicals and pollutants that are introduced into the atmosphere can impact life.
 - *Canopy microclimate* – because the uppermost level of a forest (or prairie), the canopy, has variations of climate, vegetation, and animals that are of special, scientific interest.
 - *Air pollution* – because dust and pollutants caused by human activity can impact life.
 - *Carbon* – because increasing concentrations of carbon dioxide in the atmosphere indicate that the amount of carbon released exceeds the Earth's capacity to absorb it = global warming.
 - *Fresh water* – because changes in chemistry and the volume of subsurface waters can impact availability and quality of water for drinking, recreation, agriculture, and industry in downstream area.

- **Airborne Observations**
 - One of the goals is to collect detailed aerial data about regional landscapes and vegetation. This will be accomplished by using aircraft that fly routine patterns over the NEON sites.
 - Imaging spectrometer – creates an image the ground at narrow wavelength bands in visible and infrared light.
 - Waveform light detection and ranging instrument (wLiDAR) – sends out laser pulse and measures the time difference between the outgoing and returning light to determine the structure of vegetation and buildings below
 - High-resolution digital camera – provides detailed aerial views of the regional landscape.

- All of aerial data collectively provides a broad view of:
 - Land use
 - Vegetation structure
 - Biochemical and biophysical properties of vegetation
 - Ecosystem responses to changes in land use, climate, and the movement of invasive species.

Appendix:

1. List of Eco-Region Domains – with Core Terrestrial Sites:

- Northeast (MA, NH – Harvard Forest)
- Mid-Atlantic (VA, MD – Smithsonian Conservation Biology Institute)
- Southeast (FL, GA – Odway-Swisher Biological Station)
- Atlantic Neotropical (PR – Guanica Forest)
- Great Lakes (WI, MI – Univ of Notre Dame Environ. Research Ctr)
- Prairie Peninsula (KS – Konza Prairie)
- Appalachians & Cumberland Plateau (TN, VA – Oak Ridge National Lab.)
- Ozarks Complex (AL – Talladega National Forest)
- Northern Plains (ND – Woodworth)
- Central Plains (CO – Central Plains Experimental Range)
- Southern Plains (TX, OK – LBJ National Grassland)
- Northern Rockies (MT, WY – Yellowstone Northern Range)
- Southern Rockies (CO – Niwot Ridge Mountain Research Station)
- Southern Rockies & Colorado Plateau (CO, UT)
- Desert Southwest (AZ, NM – Santa Rita Experimental Range)
- Great Basin (UT – Onaqui-Ault)
- Pacific Northwest (WA, OR – Wind River Experimental Forest)
- Pacific Southwest (CA – San Joaquin)
- Tundra (AK – Toolik Lake)
- Taiga (AK – Caribou Creek – Poker Flats)
- Pacific Tropical (HI – Olaa Forest Reserve)

2. Web site resources:

Main web site: <http://www.neoninc.org/about/overview>

Map and list of the field sites:

<http://www.neoninc.org/science/domains>