

# Terrestrial Observation System Overview

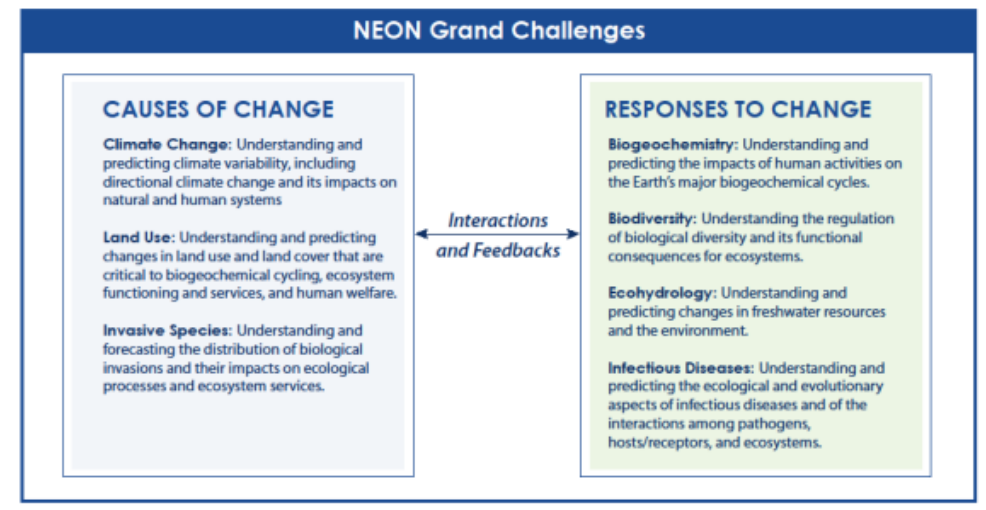
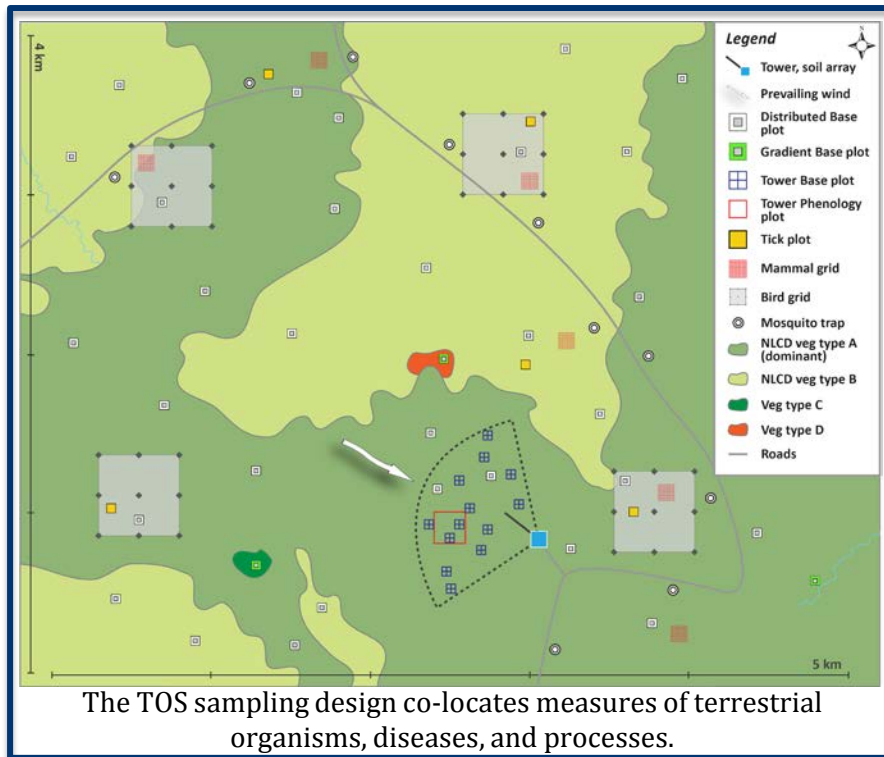
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The **National Ecological Observatory Network (NEON)** is a continental-scale ecological observation platform for understanding and forecasting the impacts of climate change, land use change, and invasive species on ecology.

In an effort to link causes and consequences of change, multiple components of ecological systems will be observed:

- Remote sensing will measure structure and biogeochemical properties of vegetation,
- A flux tower and other automated sensors will measure components of the atmosphere (e.g. precipitation, temperature, radiation) and soil (e.g. respiration, soil moisture),
- Aquatic sensors and manual observations will measure chemical, physical, and biological components of streams, rivers, and lakes,
- Field crews associated with the **Terrestrial Observation System** will collect data and samples to characterize organisms and biogeochemistry.



The **Terrestrial Observation System (TOS)** will collect data on biogeochemical cycles, infectious diseases, and a suite of focal taxa to characterize local patterns, dynamics, and linkages in terrestrial ecosystems. The selected taxa are designed to be widespread, capture a wide range of turnover time, and diverse evolution histories. Specifically, at the scale of the site, the TOS will collocate observations of:

- Plant biodiversity
- Plant biomass, leaf area, and chemical composition
- Plant phenology
- Bird composition and abundance
- Ground beetles abundance and diversity
- Mosquitos phenology, abundance, and pathogens
- Small mammals abundance, demography, and pathogens
- Tick-borne diseases
- Soil microbe abundance, diversity, and function
- Soils biogeochemistry

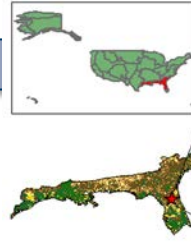
TOS protocols are designed to provide standardized data across the observatory, linkages among TOS protocols and between TOS and other NEON project areas, and where possible, complement other continental scale sampling efforts (e.g. Breeding Bird Survey, Forest Inventory Analysis).



The sample design for observations at local, site-specific scales must deliver data that optimally informs continental-scale ecology.

## 1. Continental-scale ecology

- NEON Goals and Questions
  - Scale to the continent
  - Compare sites
  - Annual time steps



## 2. Statistically rigorous

- Randomize
  - Spatially balanced
  - Complete sample design

## 3. Efficiently measure population

- Stratify by vegetation
  - Characterize regional patterns
  - Efficiently describe population parameters

## 4. Sample with sufficient intensity

- Determine minimum sample size
  - Facilitate many questions and analyses
  - Initially test the ability to detect a difference in the magnitude of trends characterized by two sites

## 5. Efficient and informative

- Allocate sampling effort for:
  - Scaling
  - Data assimilation
  - Comparison
  - Constraints
  - Analysis

## 6. Design optimization

