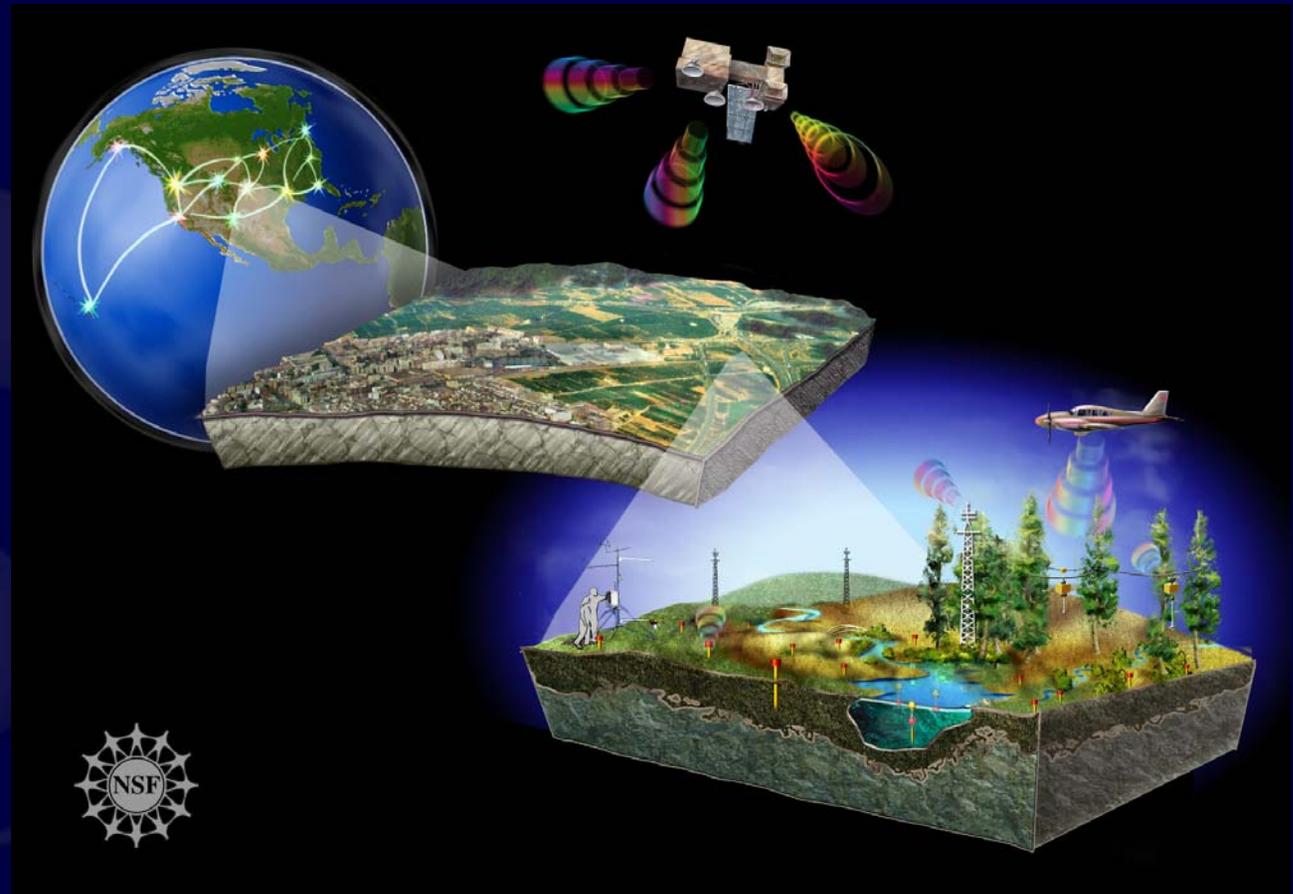


The National Ecological Observatory Network (NEON)

Brian Wee

Executive Director,
NEON, Inc.

Sep 25, 2007



The Changing Landscape: Climate



Portage Glacier
(Kenai Peninsula, AK)

1958

(Source: NOAA)

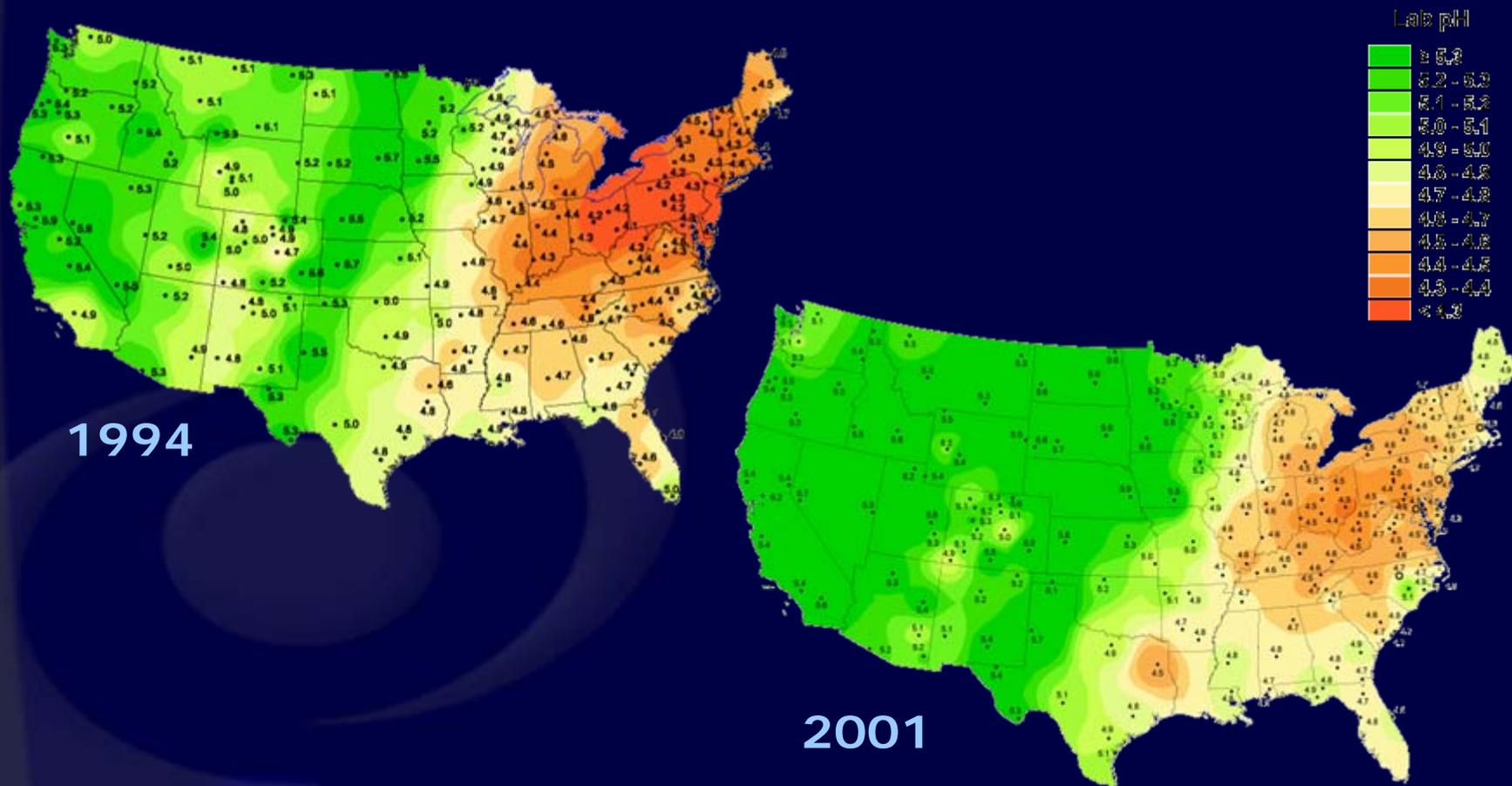


2001

(Source: John Kalpus)

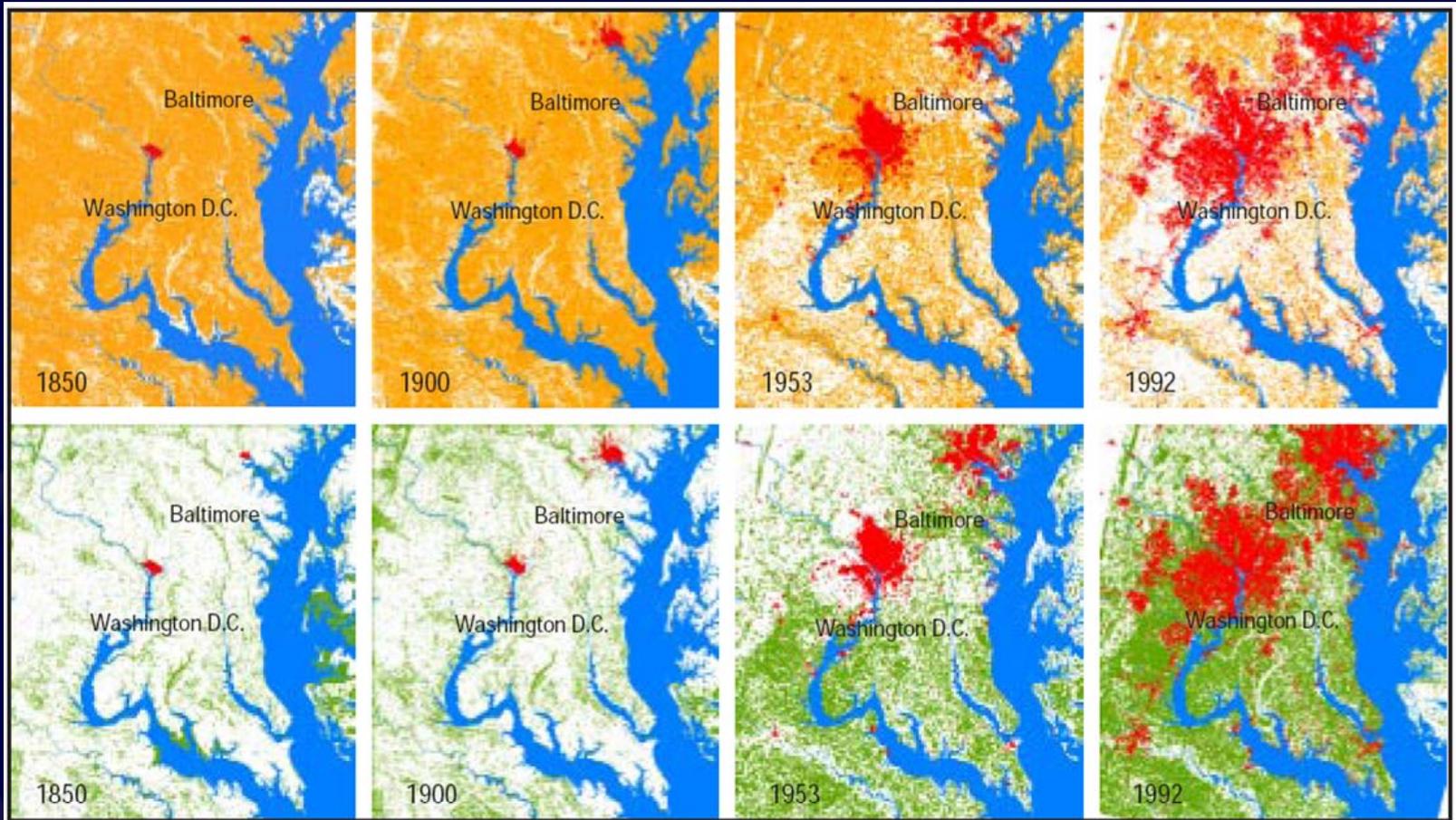
The Changing Landscape: Biogeochemistry

NADP isopleth map of hydrogen ion concentration as pH in 1994 vs 2005



(Source: NADP)

The Changing Landscape: Land Use



Grand Challenge Areas in the Environmental Sciences

- Biodiversity
- Biogeochemical cycles
- Climate change
- Hydroecology
- Infectious disease
- Invasive species
- Land use

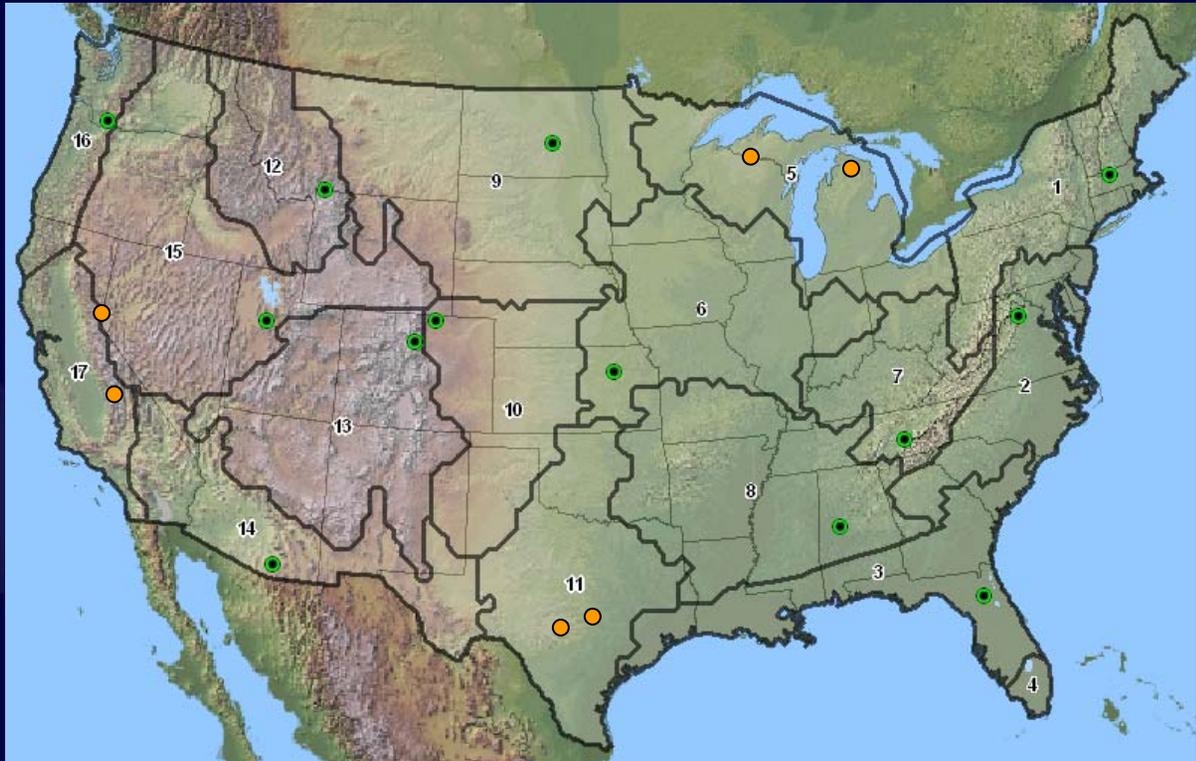
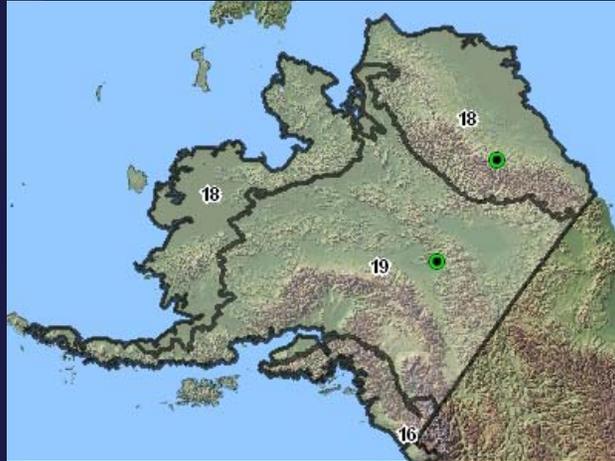
NEON Science Vision

Provide the capacity to forecast future states of ecological systems for the advancement of science and the benefit of society.

NEON Education Vision

Prepare society and the scientific community to use NEON data, information, and forecasts in order to understand and effectively address critical ecological questions and issues.

NEON Climate Domains



Overall Strategy

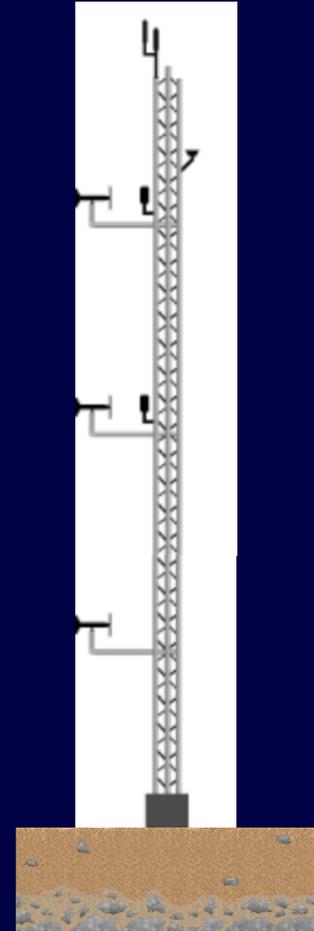
- Backbone of core wildland sites as controls (30 year life-span)
- Deployment of relocatable scientific assets at pre-determined, science-driven locations
- Opportunistic deployment of assets at other locations
- Use of airborne and space-based instruments to interpolate site specific measurements
- Comprehensive cyberinfrastructure (CI) to integrate measurements and deliver data products to the community (scientific, educational, general public)

Data Acquisition Systems

- FIU: Fundamental Instrument Unit
- FSU: Fundamental Sentinel Unit
- MRP: Mobile Relocatable Platform
 - RTS: Relocatable Tower System
 - RDS: Rapid Deployment System
- AOP: Airborne Observation Platform
- LUAP: Land-use Analysis Package
- GCE: Global Change Experiment
- STREON: Stream Research Experimental and Observational Network

FIU

- Canopy-height dependent tower
- Meteorological instruments
- Basic air quality instruments
- Location / science question dependent combination of any of the packages:
 - Eddy covariance
 - Advanced air quality
 - Dust sensors
- Aquatic sensor-array
- Canopy microclimate sensor-array
- Soil sensor-array



*Illustration Credit:
Jason C. Fisher*

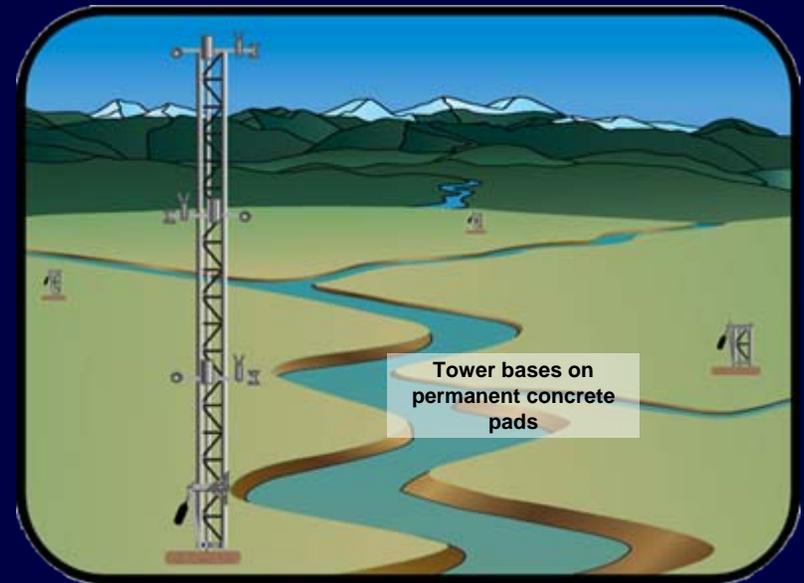
FSU

- Sampling and survey of:
 - Vascular plants
 - Small mammals
 - Birds
 - Fish, Aquatic invertebrates, algae
 - Terrestrial invertebrates
- Bioanalysis of samples:
 - DNA
 - Isotope
 - Pathogens
 - Others



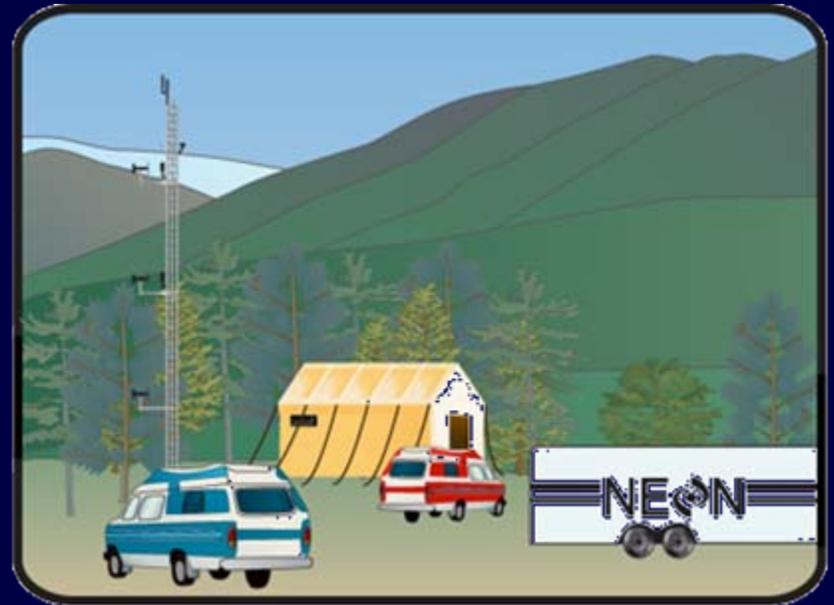
MRP: RTS

- Relocatable Tower System
 - Permanent tower pad
 - Tower base
 - Relocatable tower superstructure with relevant sensor package(s):
 - Eddy covariance
 - Advanced air quality
 - Dust sensors



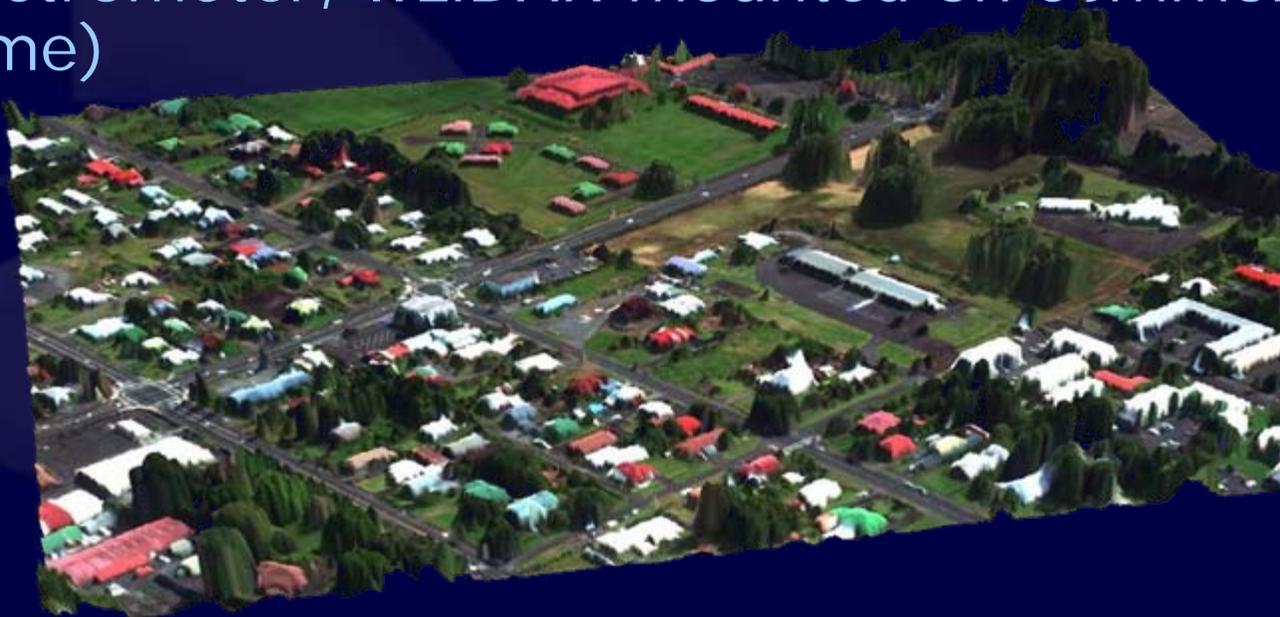
MRP: RDS

- Rapid Deployment System
 - Towing vehicle
 - Trailer to transport one or more of the following modular units:
 - Aquatics, Canopy, Climate, Invasive Species, Education, Soils, Infectious Disease



AOP

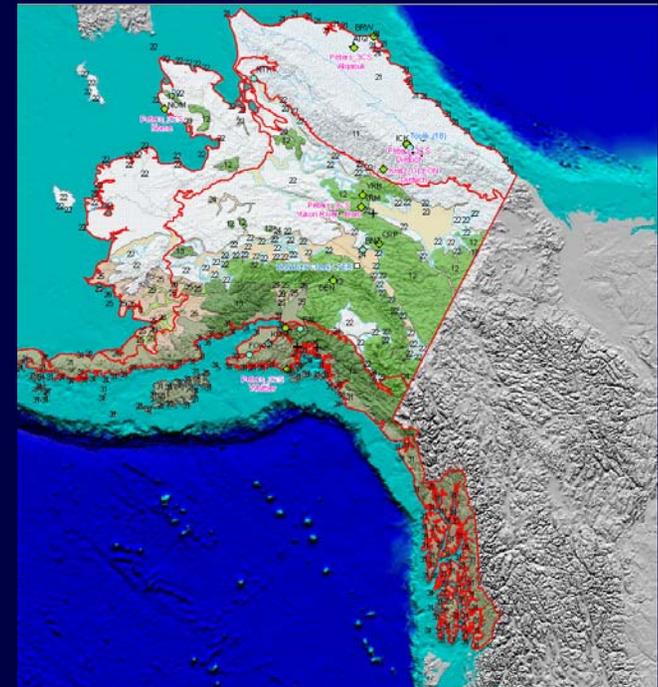
- High resolution airborne images for extrapolating locally calibrated results to regions
- Prototype system: Carnegie Airborne Observatory (fully integrated imaging spectrometer, wLiDAR mounted on common frame)



LUAP

To provide data at the site to national scale:

- Land-use / land-cover (LULC) context of NEON observations,
- On the socio-economic context of the LULC.
- Offers ecologists whose primary expertise is not in geospatial analysis:
 - Spatially extensive datasets in a number of standard spatial / temporal resolutions,
 - An interface that supports the exploration and discovery of multiple related geospatial datasets.



Continental Scale Experiment #1

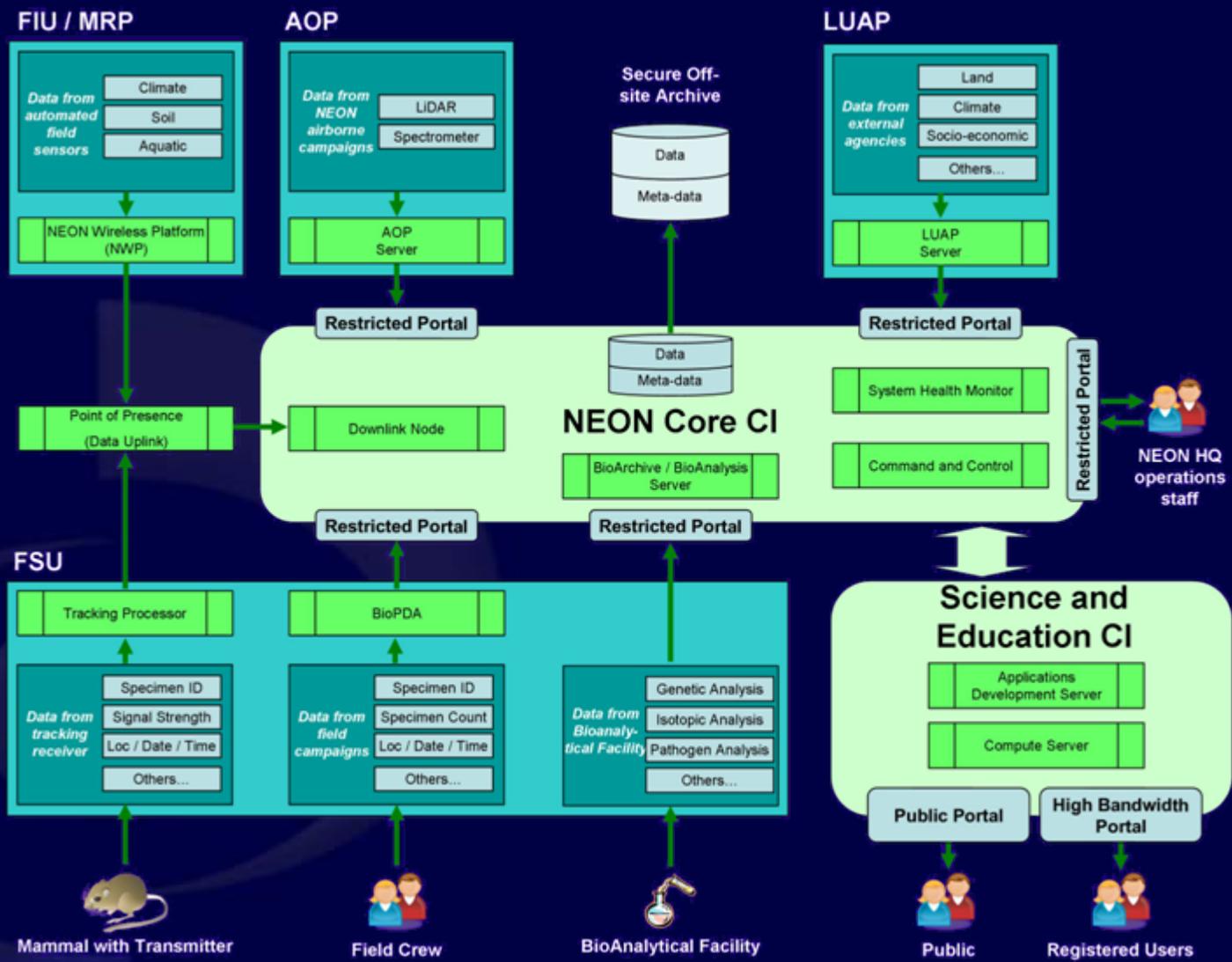
- Terrestrial Global Change Experiment (GCE)
 - Leads: Melinda Smith, Alan Knapp, Chris Field
 - Questions:
 - How do ecosystems of the US differ in their sensitivity to global change drivers?
 - How will they respond to global changes?



Continental Scale Experiment #2

- Stream Research Experimental and Observational Network (STREON)
 - Leads: Walter Dodds, Margaret Palmer, Brad Cardinale
 - Primary question: How will chronic nutrient inputs, extreme events (droughts and floods), and simplification of food webs (loss of consumers) impact the *resistance* and *resilience* of stream ecosystem function?

NEON Cyberinfrastructure (CI)



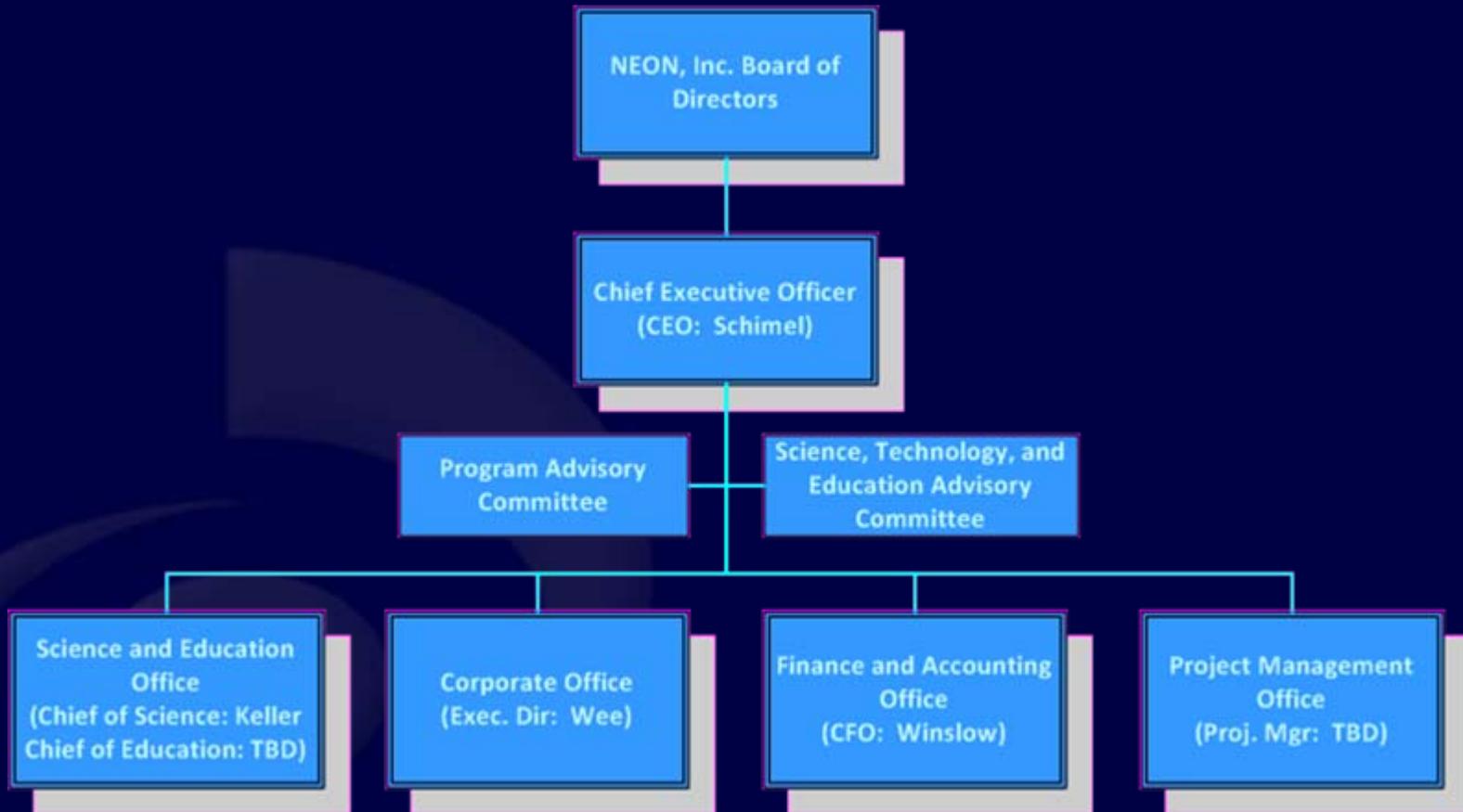
How did we get here? NEON Development Phase



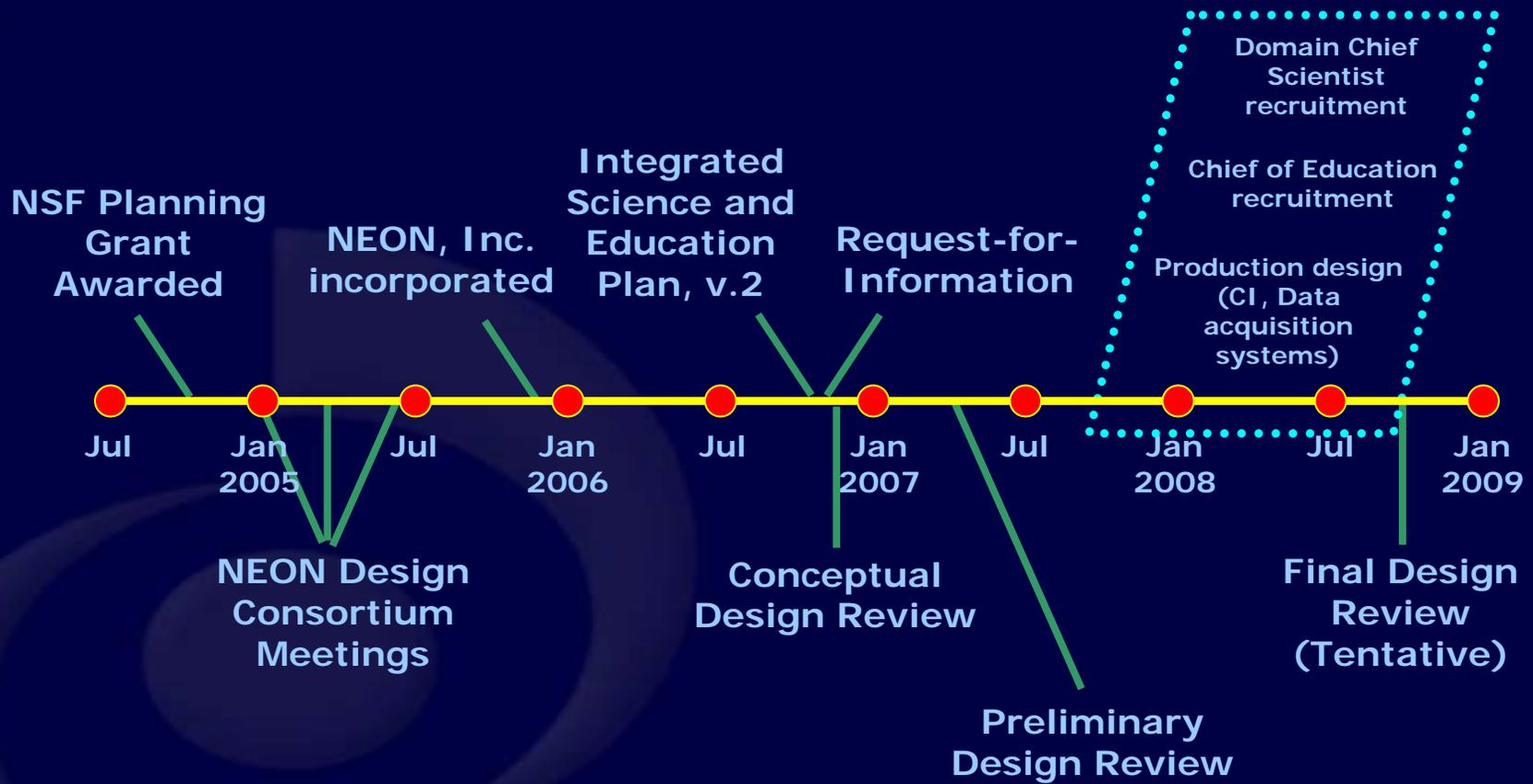
NEON, Inc.

- Incorporated 12/2005 in Washington, D.C.
- Membership based organization.
- Board of Directors:
 - 15 to 17 directors
 - At-large group elected or appointed by directors
 - Membership group elected or appointed by members
 - Majority of directors are from the At-Large group
 - Rotating three year terms

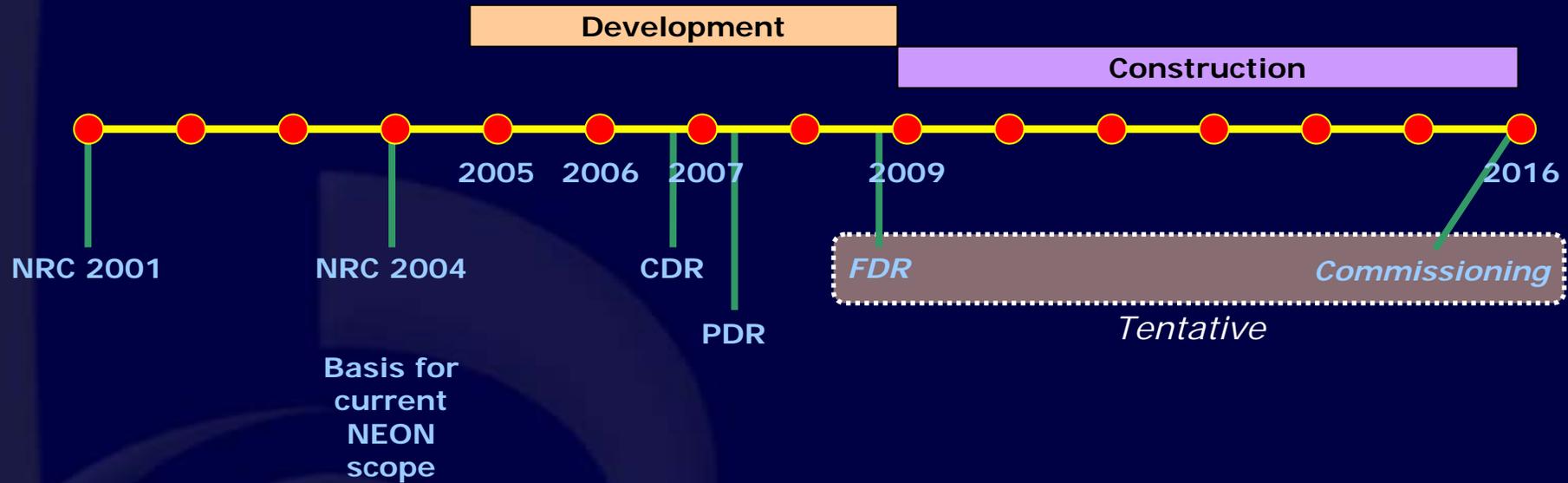
NEON, Inc.



NEON Development Phase



NEON's Overall Trajectory



Questions