



Introduction to NEON's Land Use Analysis Package (LUAP) and regional / continental scale geospatial framework

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U.S. Department of the Interior
U.S. Geological Survey

Introduction to NEON

... a continental-scale research platform for discovering and understanding ecological principals that govern the responses of large-scale biosphere, geosphere, hydrosphere, and atmosphere.

NEON Mission

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

USGS Geography collaboration with NEON

- NSF has developed an ambitious plan for a 30-year program that addresses ecological “grand challenges”, including: biodiversity, biogeochemical cycles, climate change, hydroecology, infectious disease, invasive species, and land use change.
- USGS Geography has much to offer NEON, including our expertise in regional to continental scale observation and assessment and experience in remote sensing technologies

“Request for Information” (RFI) workshop

- NEON sent a request for information to interested researchers (late 2006)
 - USGS formed a science support team at EROS to assist panelists in evaluating responses to the RFI (early 2007)
 - USGS developed a GIS database for the RFI Workshop that has served to “jump start” the Land Use Analysis Package and a NEON Geospatial Framework (2008 and ongoing)
-

NEON RFI Workshop

- USGS EROS hosted an RFI workshop in February 2007
- 22 invited panelists
- Provided science support and a “geospatial database”



NEON RFI GIS database

- National Elevation Database (NED) and derivatives (slope, aspect, watersheds...)
- 2001 National Land Cover Database (NLCD) and derivatives (canopy, imperviousness)
- Climate data (temp, precip, frost-free days...)
- Related sites (LTER, Ameriflux, CUAHSI, NEXRAD, NOAA CRN, NAWQA, Biological Experiment Stations...)

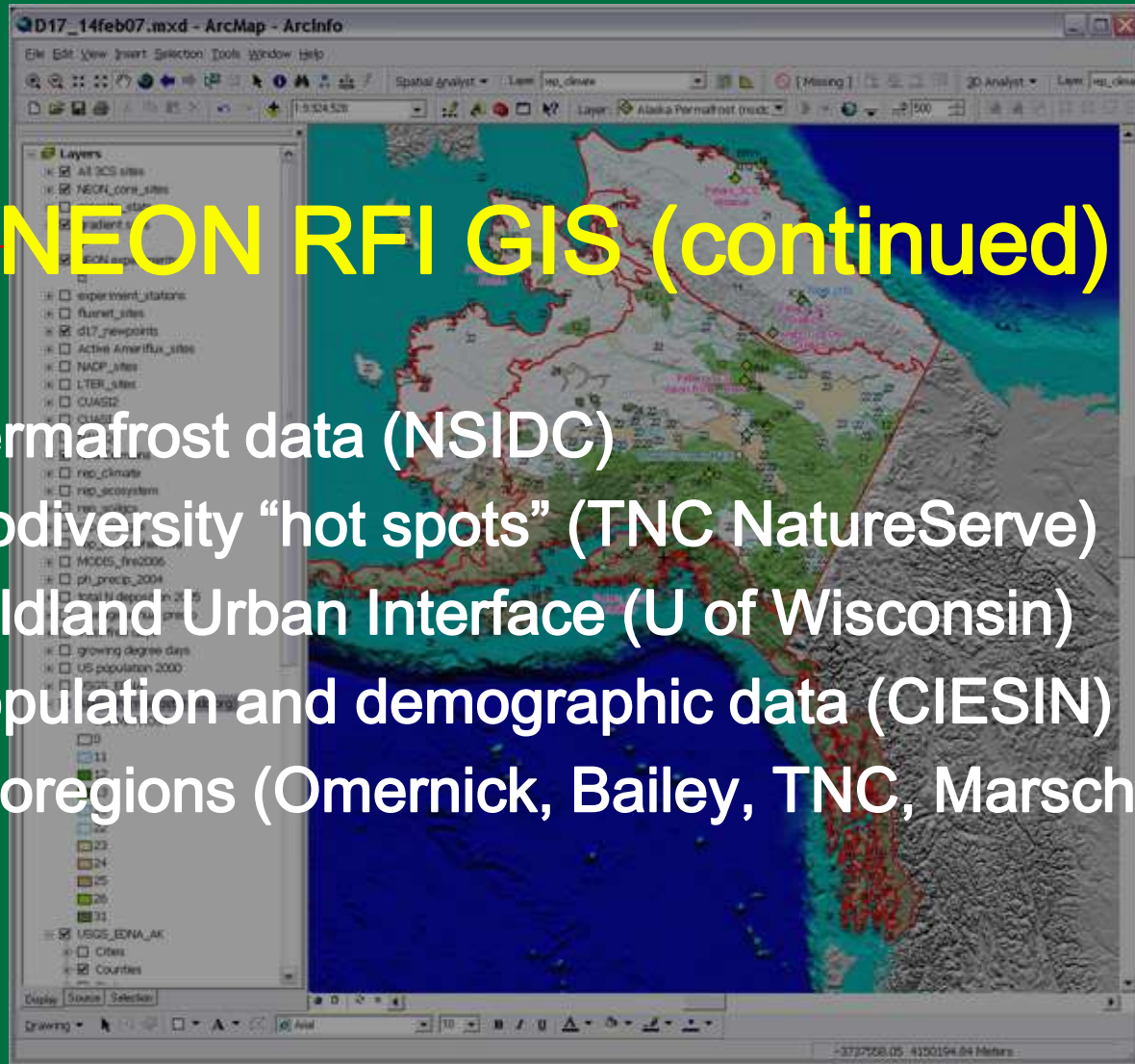
NEON RFI GIS database

Domain “Representativeness” (Hargrove)

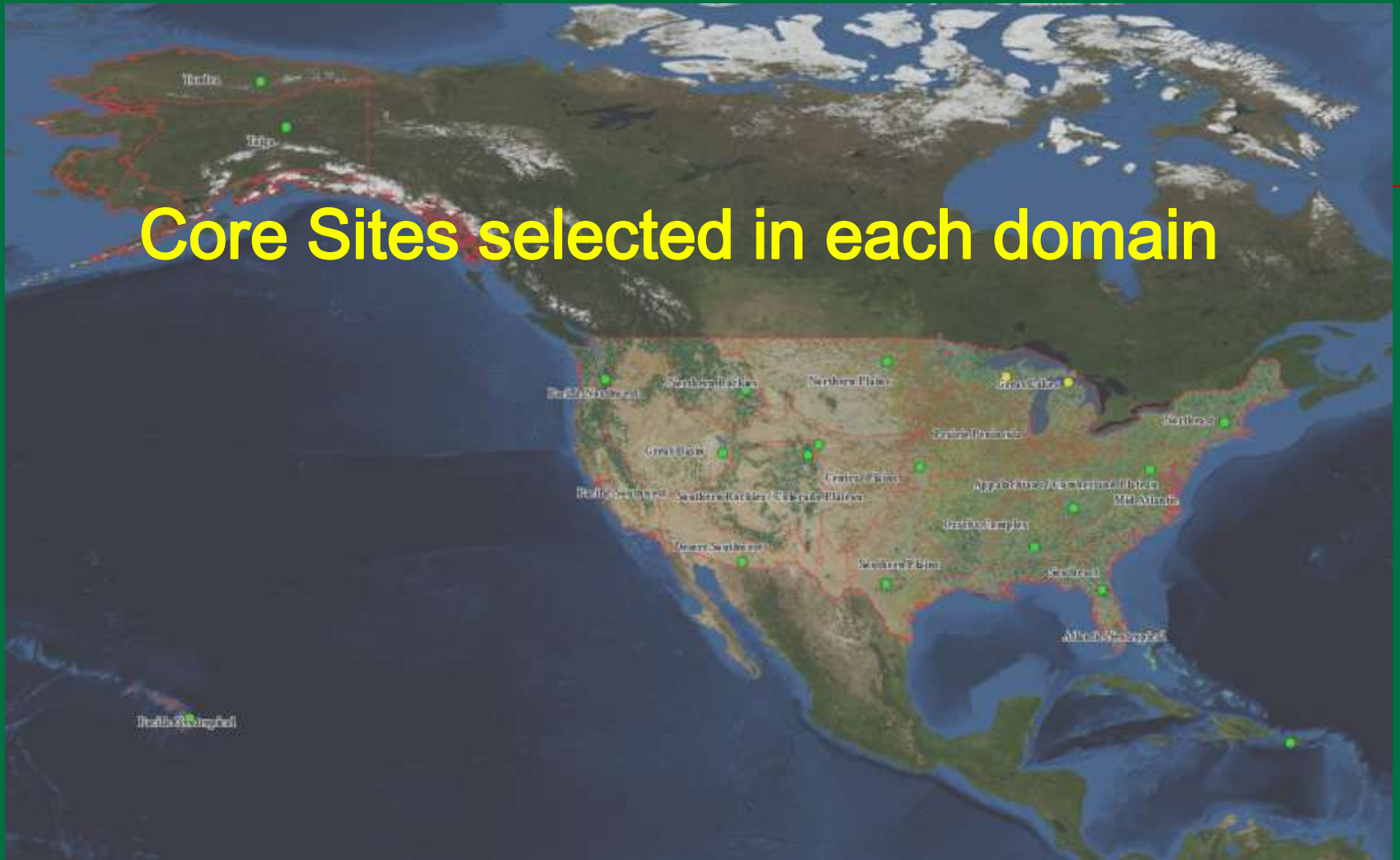
- Climate
- Soil / Landform
- Vegetation
- Ecosystem
- Comprehensive

NEON RFI GIS (continued)

- Permafrost data (NSIDC)
- Biodiversity “hot spots” (TNC NatureServe)
- Wildland Urban Interface (U of Wisconsin)
- Population and demographic data (CIESIN)
- Ecoregions (Omernick, Bailey, TNC, Marschner)



Core Sites selected in each domain



NEON Domains



- | | | | |
|-------------------------|---------------------|----------------------|---------------------|
| domains | 6 Prairie Peninsula | 12 Northern Rockies | 18 Trundra |
| 1 North East | 7 Appalachia | 13 Southern Rockies | 19 Taiga |
| 2 Mid Atlantic | 8 Ozarks | 14 Desert Southwest | 20 Pacific Tropical |
| 3 Southeast | 9 Northern Plains | 15 Great Basin | |
| 4 Atlantic Neo Tropical | 10 Central Plains | 16 Pacific Northwest | |
| 5 Great Lakes | 11 Southern Plains | 17 Pacific Southwest | |

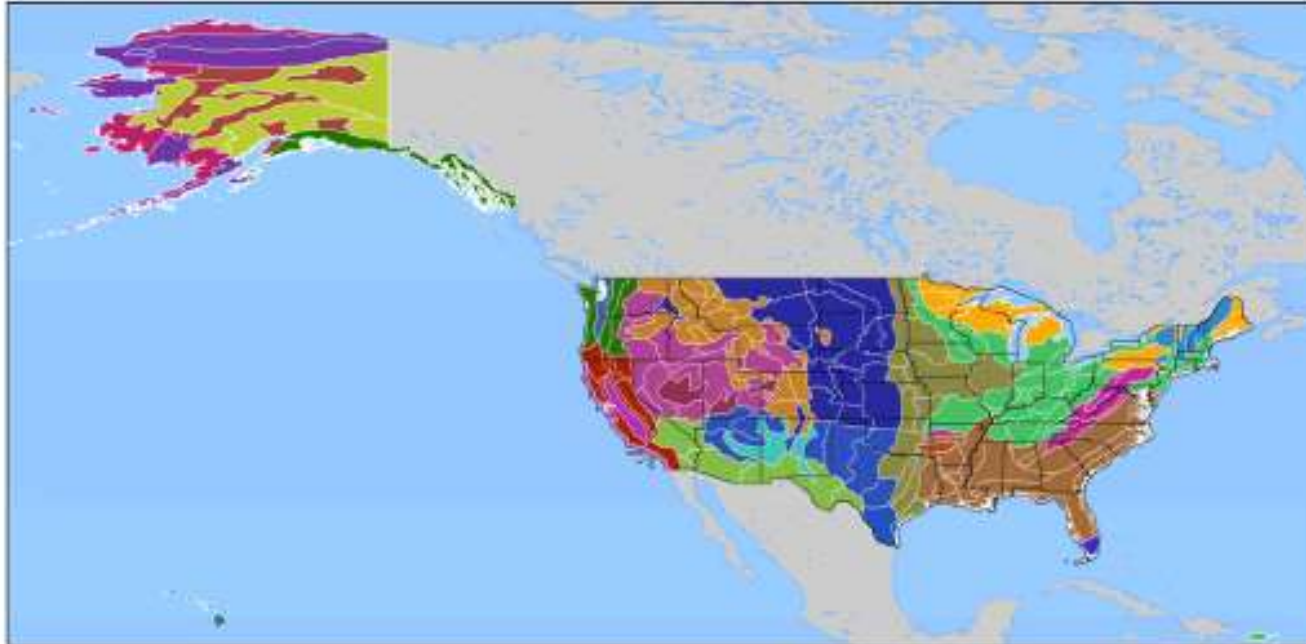
NEON Collaborative Sites



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• NADP_sites • fluxnet_sites • exp_stations

Bailey's Ecoregions of the United States



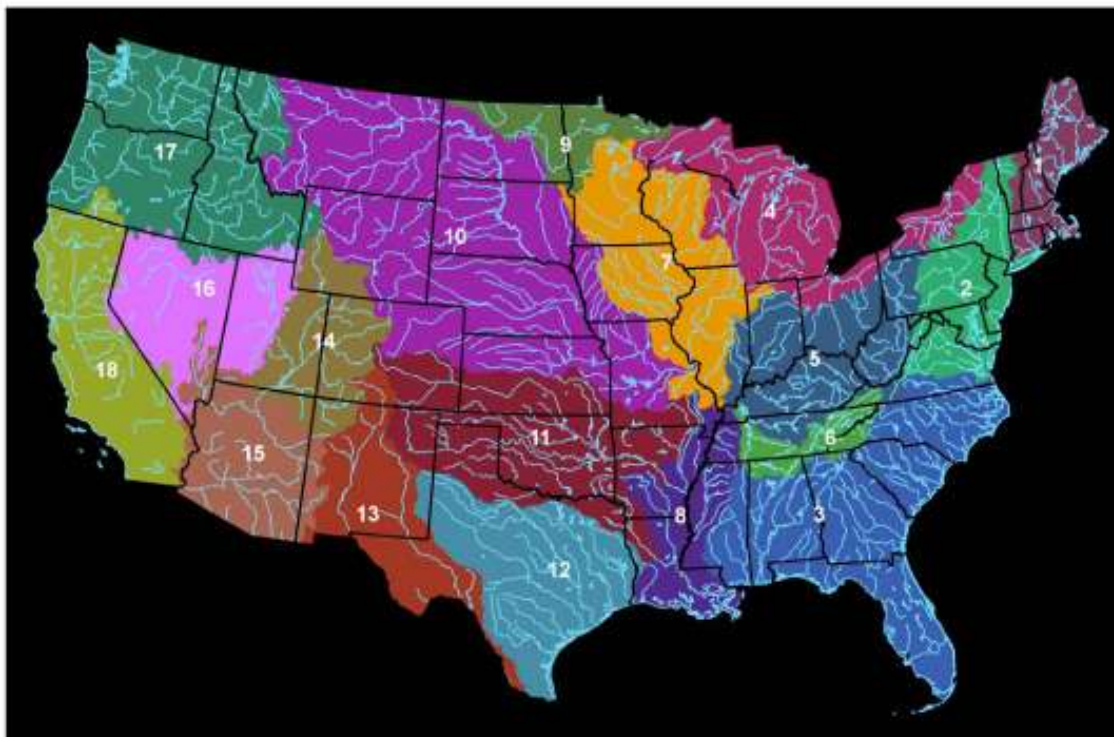
DIVISION

- | | | | |
|--------------------------------------|-----------------------------|-----------------------------------|---------------------------------------|
| Hot Continental Division | Pinnac Division | Subtropical Division | Tropical/Subtropical Regime Mountains |
| Hot Continental Regime Mountains | Rainforest Regime Mountains | Subtropical Regime Mountains | Tropical/Subtropical Steppe Division |
| Marine Division | Savanna Division | Temperate Desert Division | Tundra Division |
| Marine Regime Mountains | Savanna Regime Mountains | Temperate Desert Regime Mountains | Tundra Regime Mountains |
| Mediterranean Division | Subarctic Division | Temperate Steppe Division | Warm Continental Division |
| Tropical/Subtropical Desert Division | Subarctic Regime Mountains | Temperate Steppe Regime Mountains | |
| | | Warm Continental Regime Mountains | |

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White lines represent province boundaries within the division

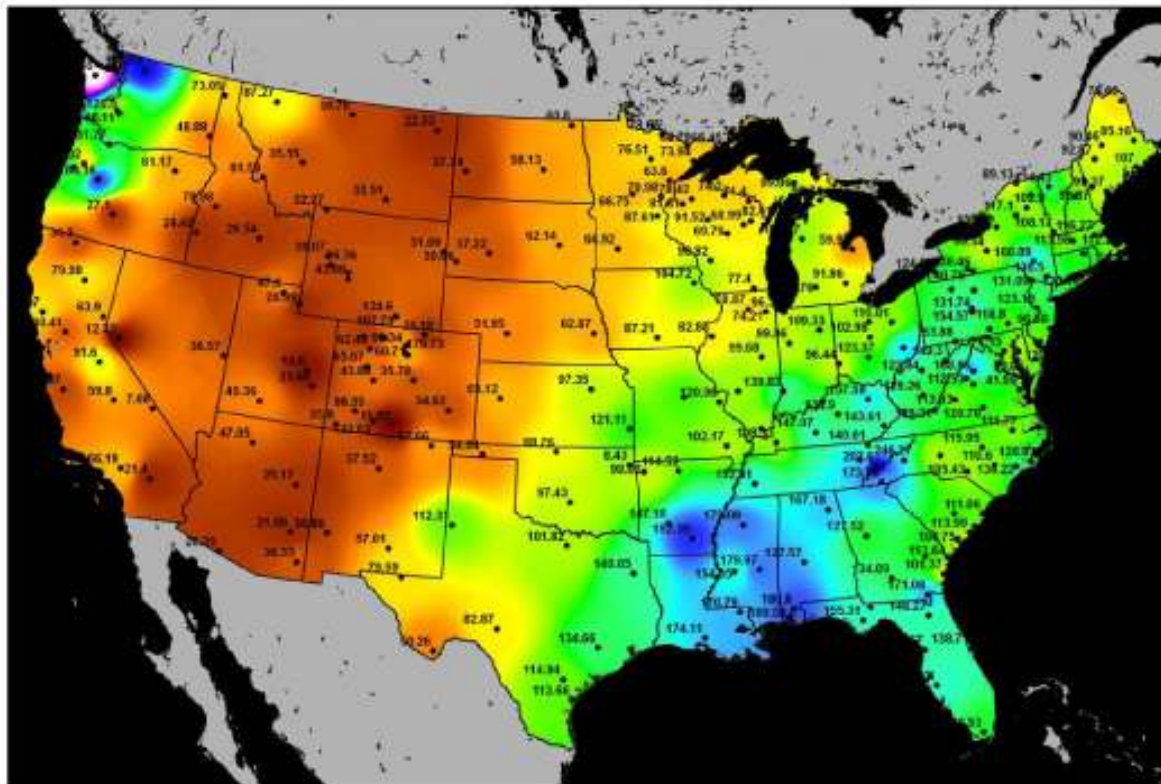
Regional USGS Hydrologic Unit Code (HUC) Watersheds



HUC Watersheds

■ Arkansas-White-Red 11	■ Mid Atlantic 2	■ Souris-Red-Rainy 9
■ California 18	■ Missouri 10	■ South Atlantic-Gulf 3
■ Great Basin 16	■ New England 1	■ Tennessee 6
■ Great Lakes 4	■ Ohio 5	■ Texas-Gulf 12
■ Lower Colorado 15	■ Pacific Northwest 17	■ Upper Colorado 14
■ Lower Mississippi 8	■ Rio Grande 13	■ Upper Mississippi 7

Total Annual Precipitation - 2004



Totals (cm)

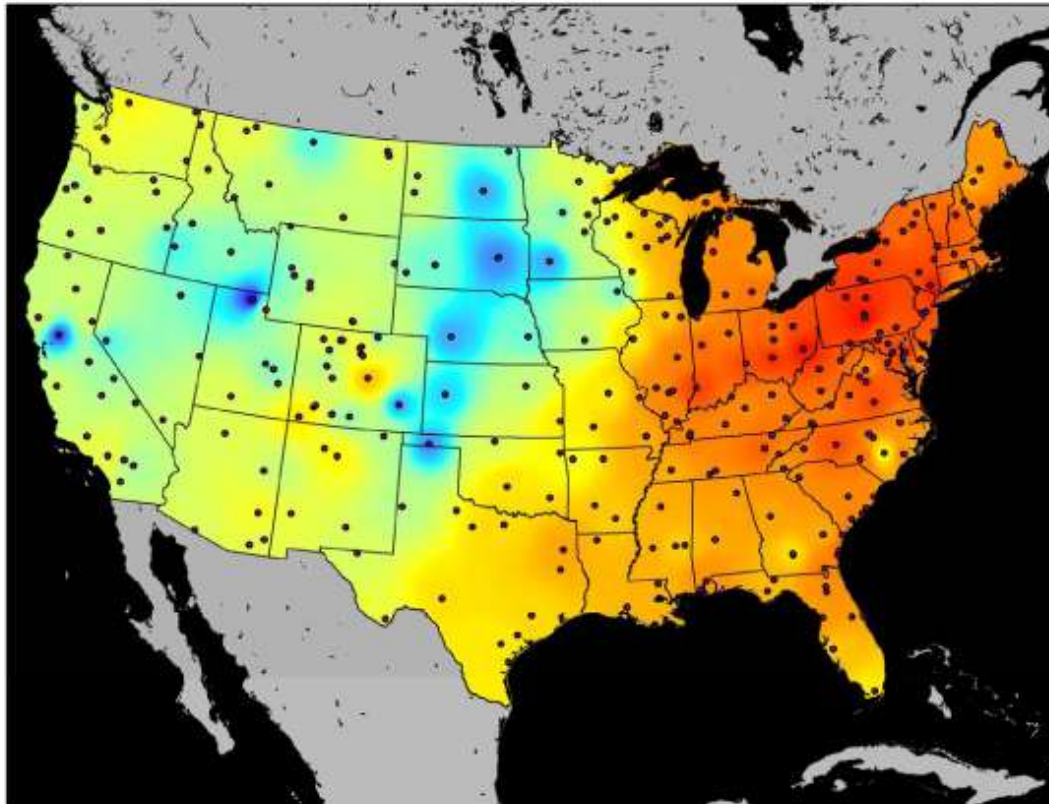


• NADP Collection Sites

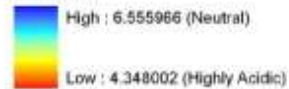
Source: National Atmospheric Deposition Program

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Acid Rain - 2004 Annual Mean pH Level of Precipitation



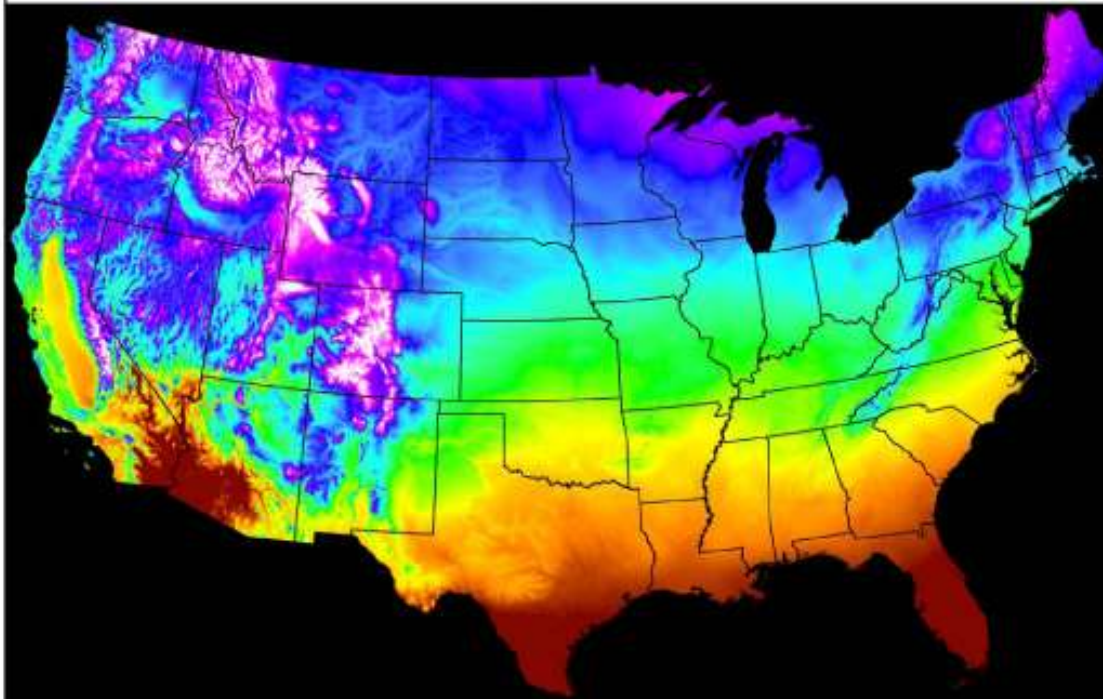
pH Value



• NADP_collection_sites

Source: National Atmospheric Deposition Program (NADP)

18-Year Mean (Annual) Growing Degree Days



Value

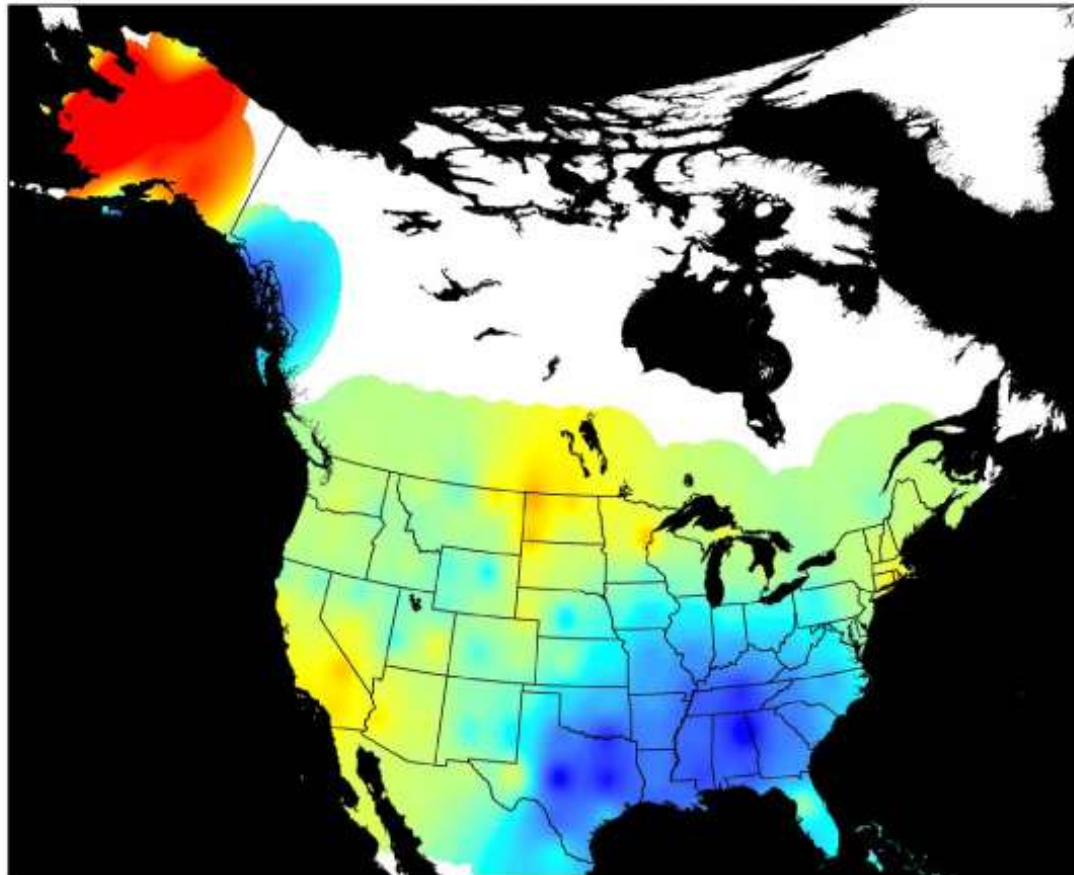


Source: Daymet

Annual growing degree days is a summation of average daily temperature for days above 0 degrees celcius.

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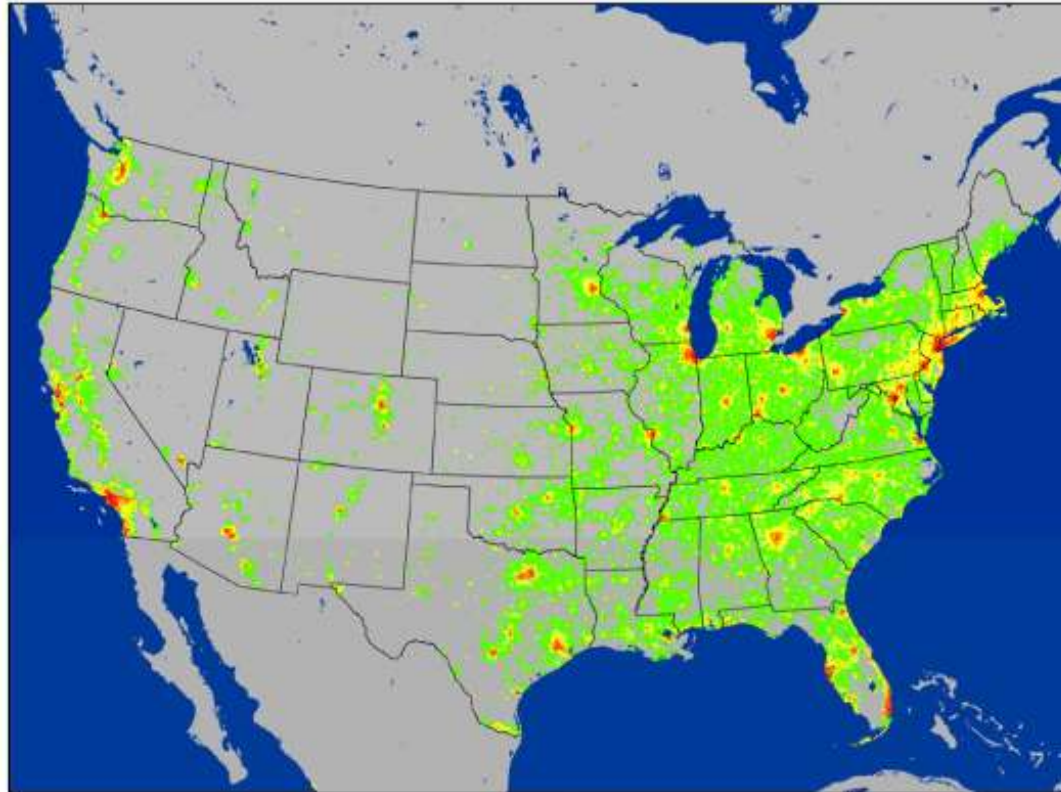
100+ Year Temperature Trend



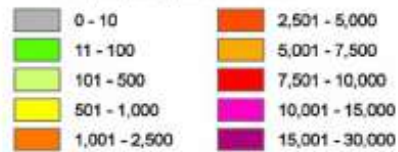
Change in deg. Celcius



Population Density of the United States - 2000

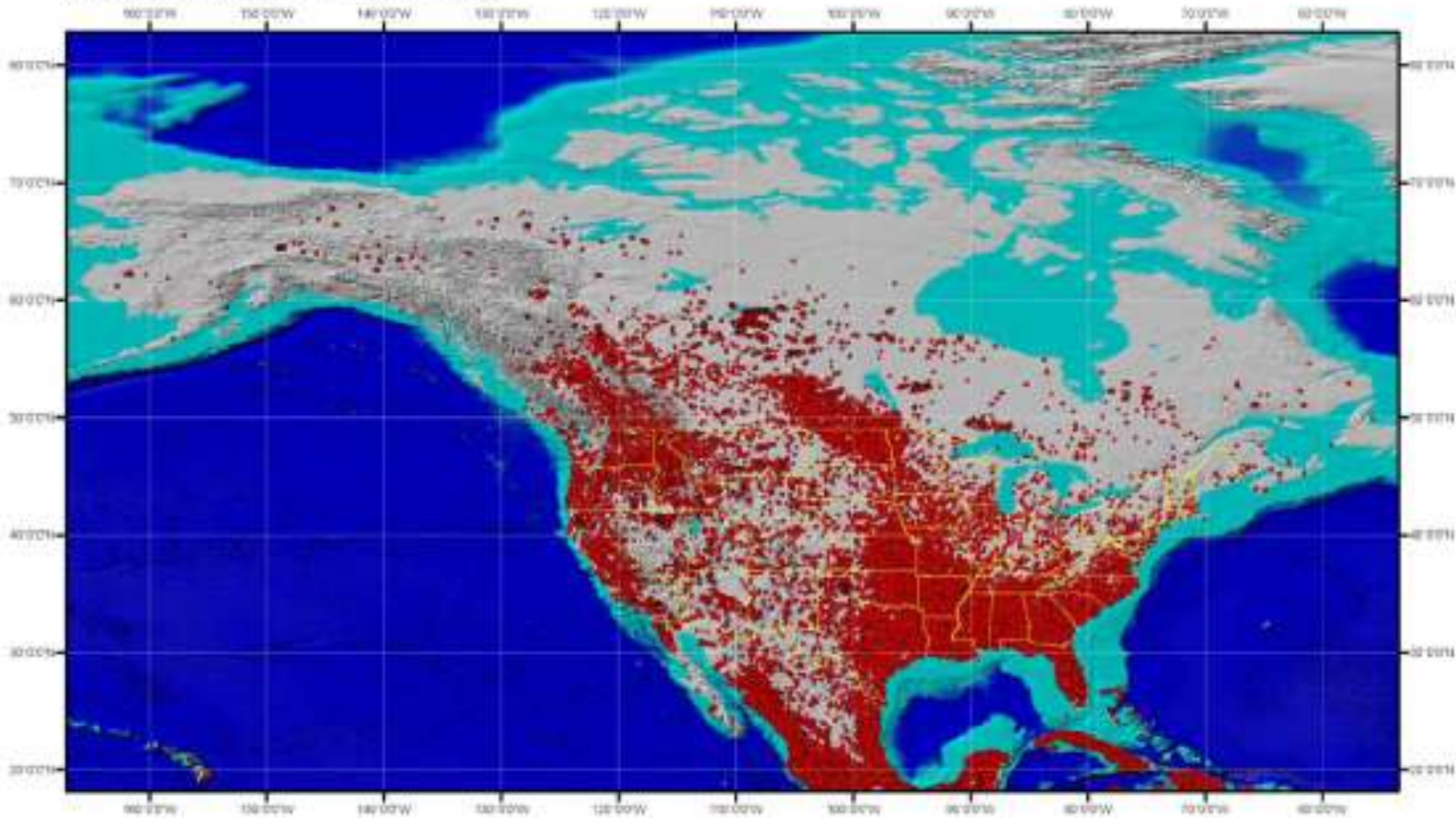


People per Square Kilometer



Source: Center for International Earth Science Information Network (CIESIN)

MODIS Detected Hot Spots - 2006



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