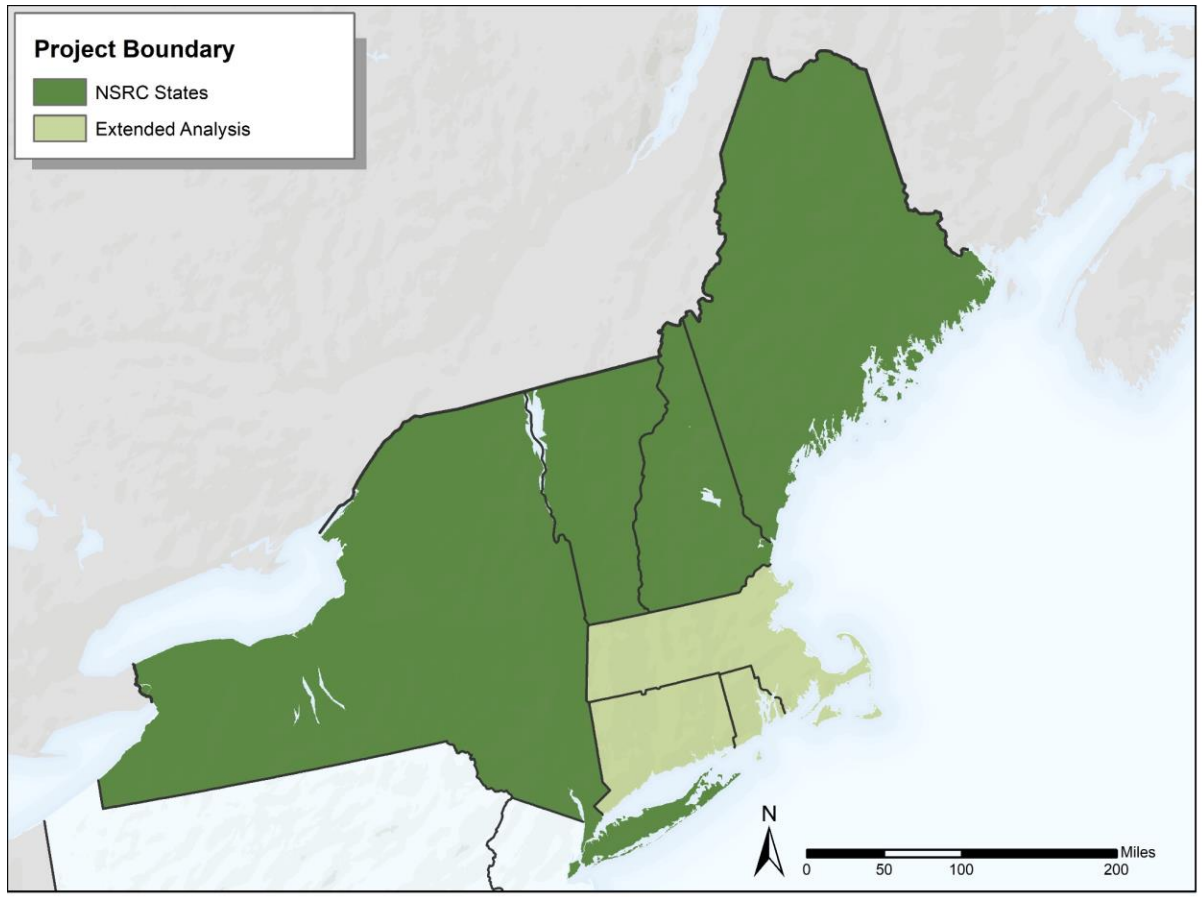
Quantifying Changes in Forest Condition, Connectivity and Resilience in the Northeast Using Geospatial and Remotely Sensed Data

FUNDER: Northeastern States Research Cooperative (NSRC)

12/12/2024



Melissa Clark
Spatial Ecologist
Center for Resilient Conservation Science (NH)
Melissa_Clark@tnc.org

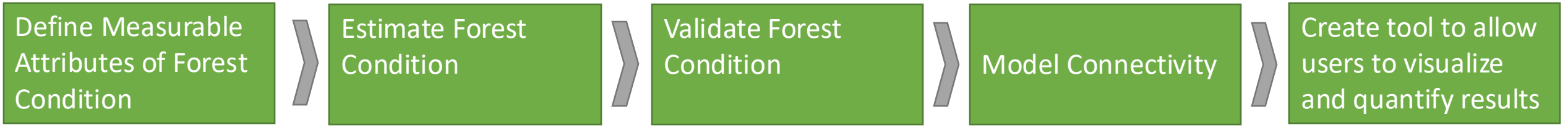
The Nature Conservancy

Center for Resilient Conservation Science

Quantifying Changes in Forest Condition, Connectivity and Resilience in the Northeast Using Geospatial and Remotely Sensed Data

Our goal in this project is to assess and synthesize information on forest condition, use that data to measure connectivity, and translate it into a user-friendly decision support tool aimed at decision makers and other concerned audiences.

General Methodology:



Products:

We want to design this project to be useful for conservation

What makes a forest in good condition?

- Multiple species present
- Vertical and horizontal complexity
  - Trees of different sizes and ages
  - Downed deadwood and standing dead trees
  - Irregular Gaps
- Quick recovery from disturbance
- Lack of pests or pathogens/Invasives
- Stressors do not cause catastrophic impact

-Dr. Ali Kosiba, *Assistant Professor of Forestry*
University of Vermont

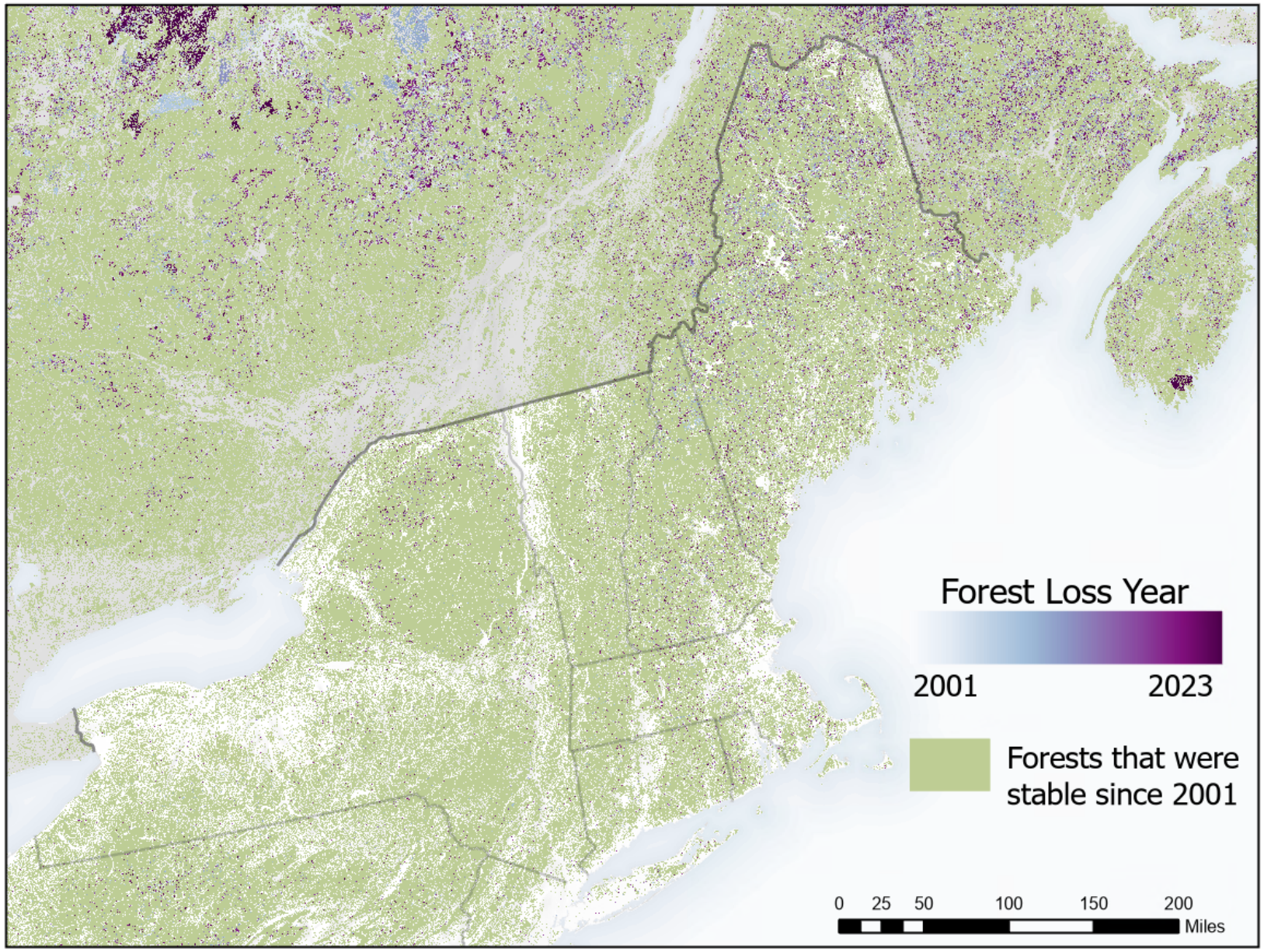
Measurable Attributes of Forest Condition

- Forest Turnover
- Forest Age/Forest Height
- Lack of Human Disturbance

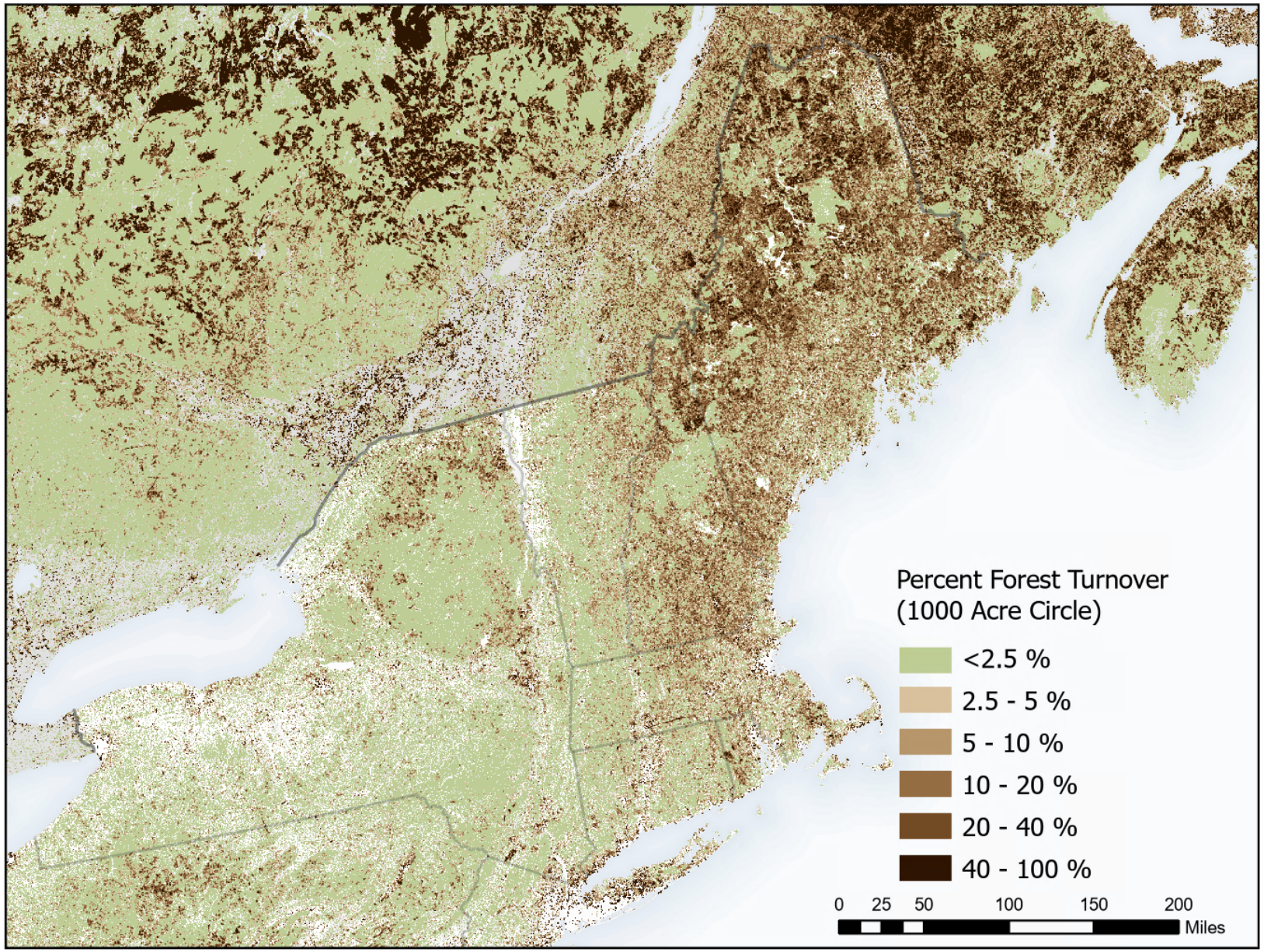
Future additions to Forest Condition

- Minor forest disturbance
- Horizonal Forest Complexity
- Species Complexity

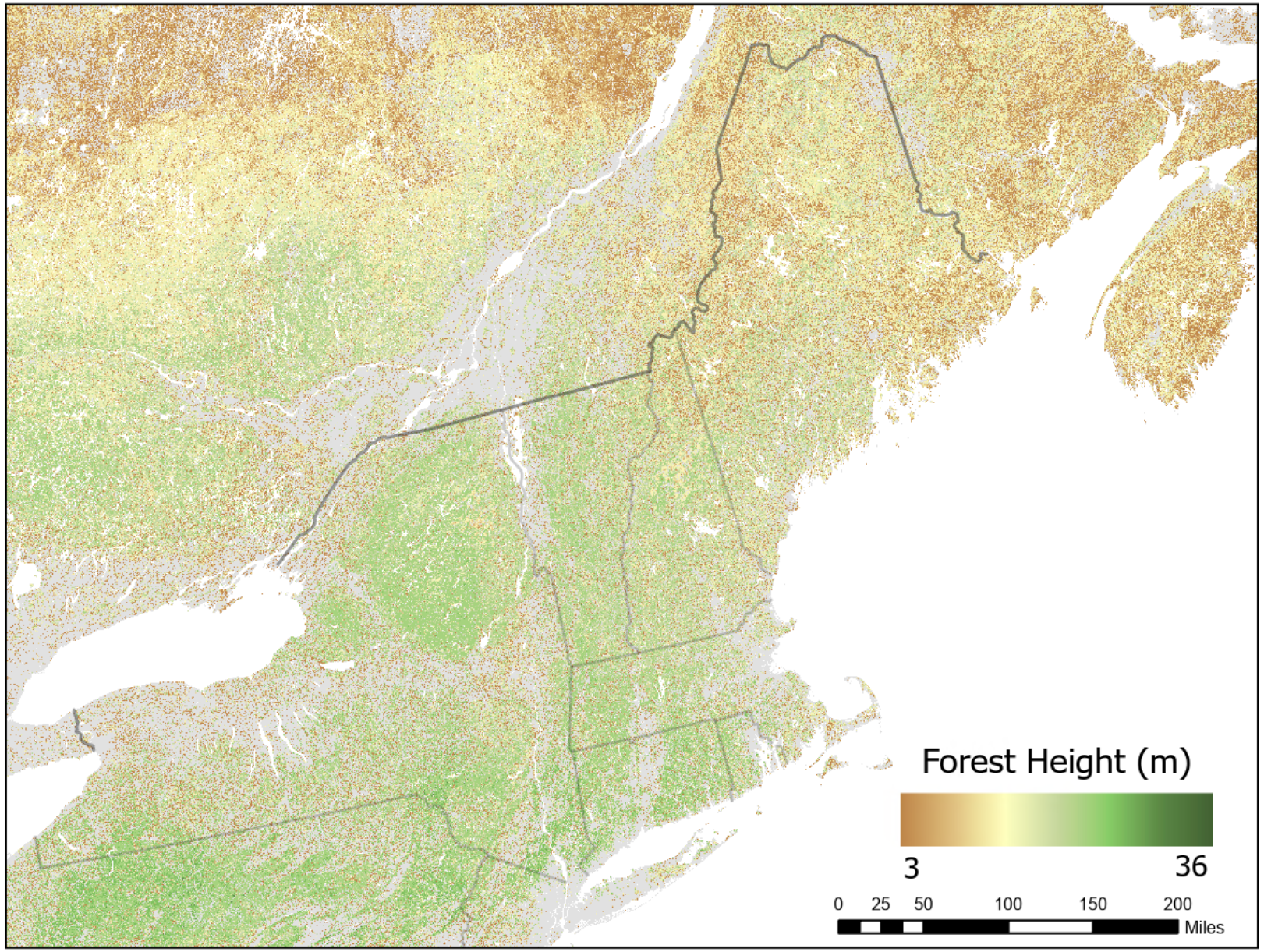
Forest Turnover



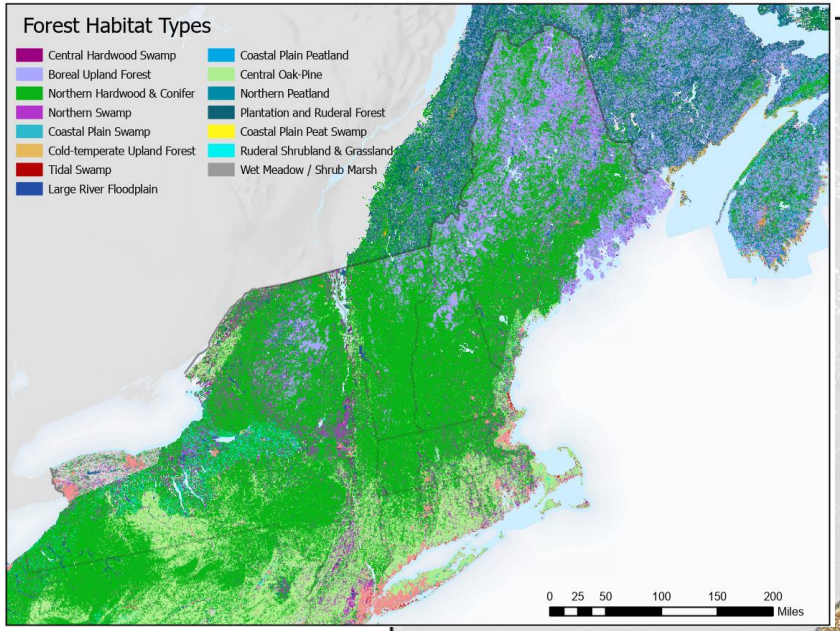
Forest Turnover



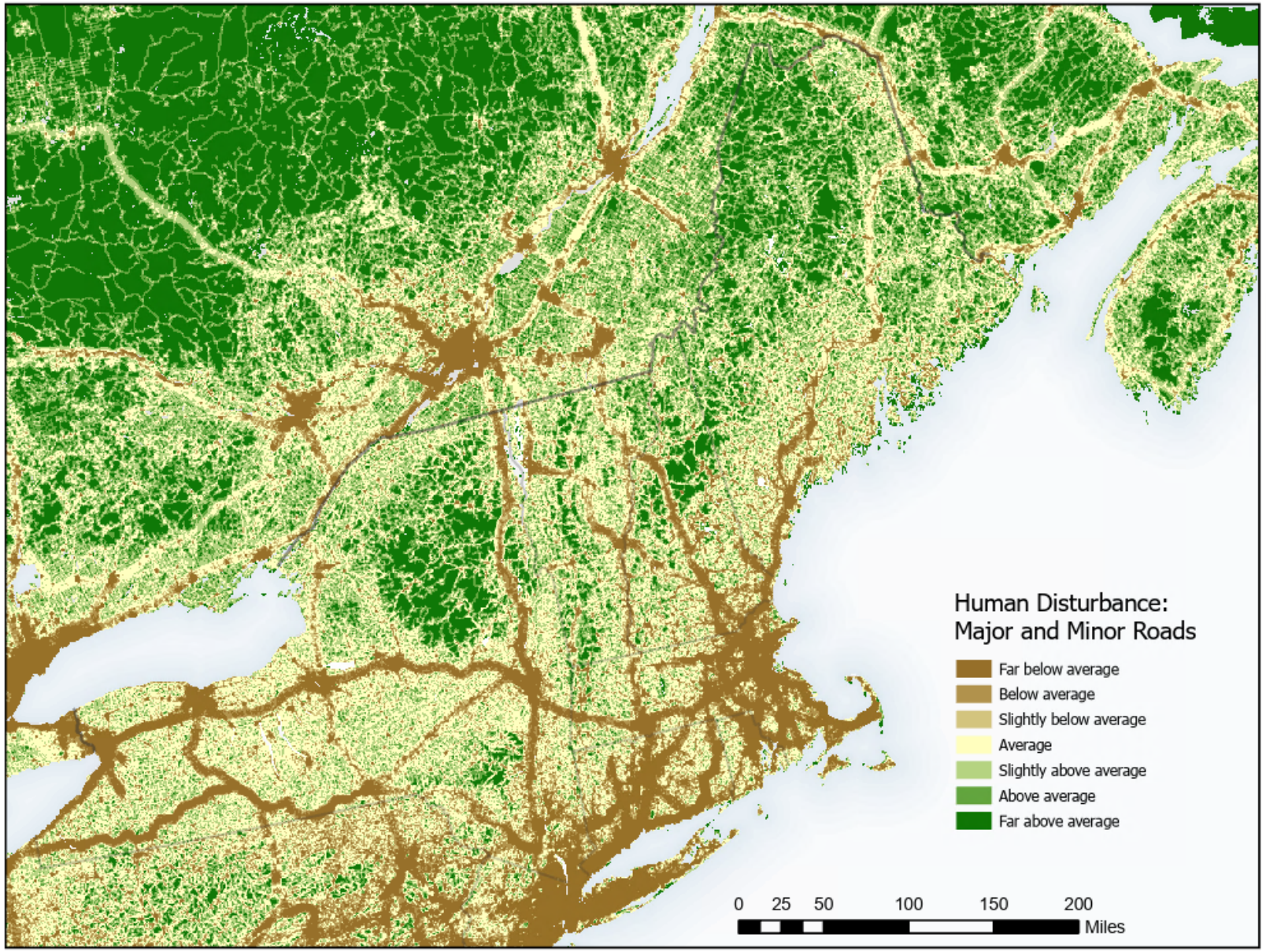
Forest Height



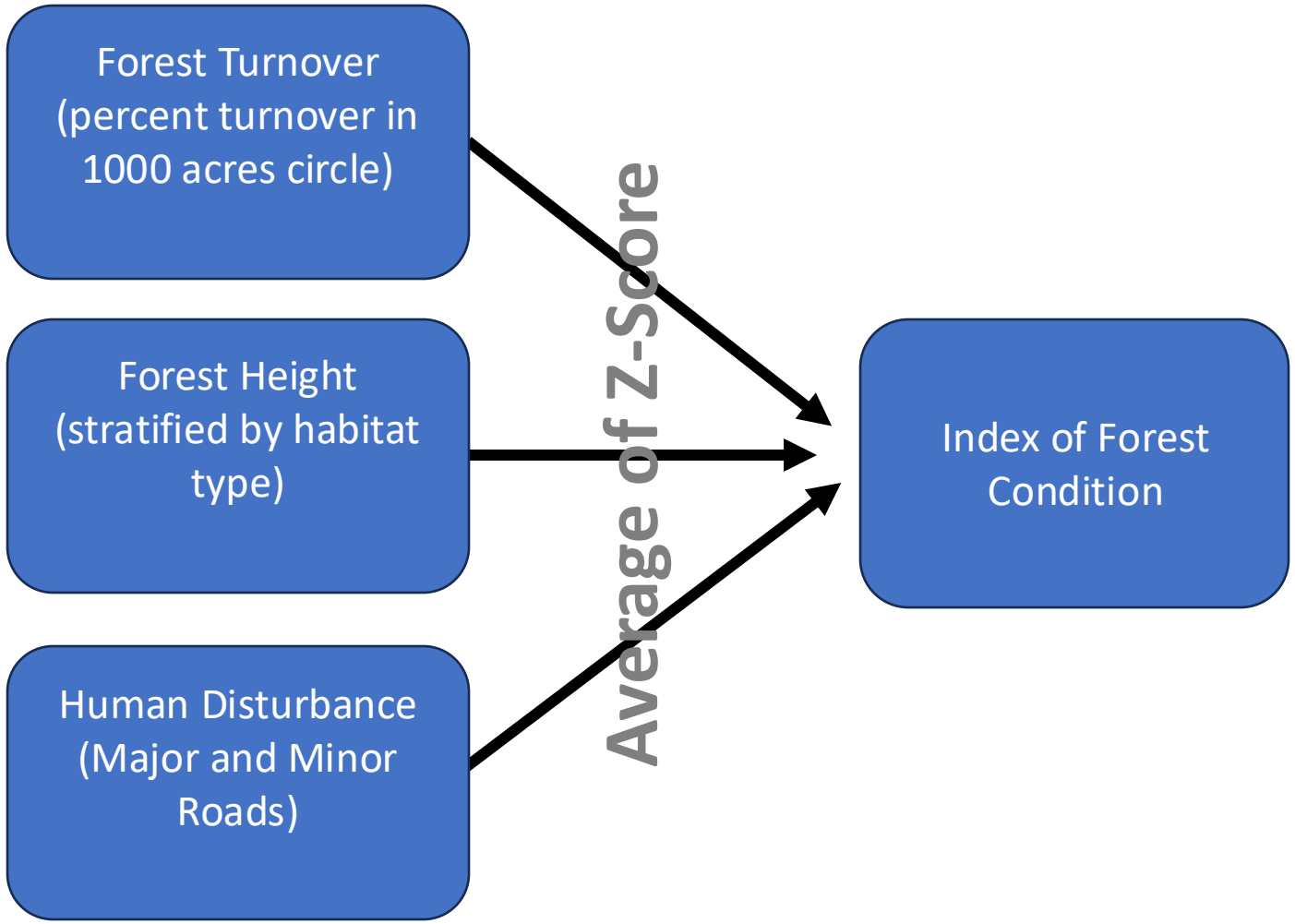
Forest Height



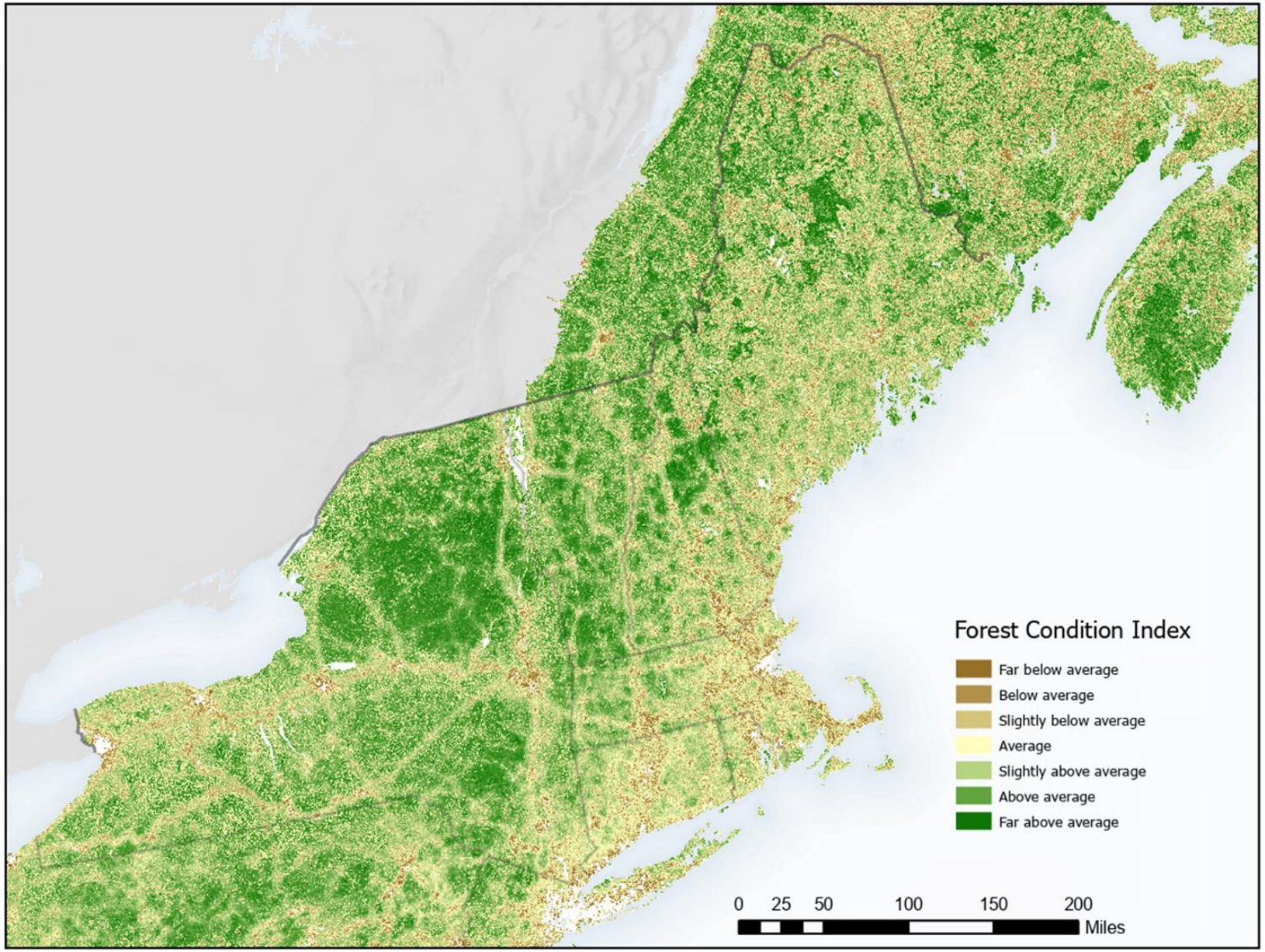
Human Disturbance



Creating the Index of Forest Condition



Index of Forest Condition



Debsconeag Lakes Wilderness Area

Forest Condition: Above Average

Forest Disturbance: some areas Below Average

Forest Height: Average to Above Average

Lack of Human Disturbance: Above Average

Waterboro Pine Barrens

Forest Condition: Slightly Above Average

Forest Disturbance: Below Average to Average (fire)

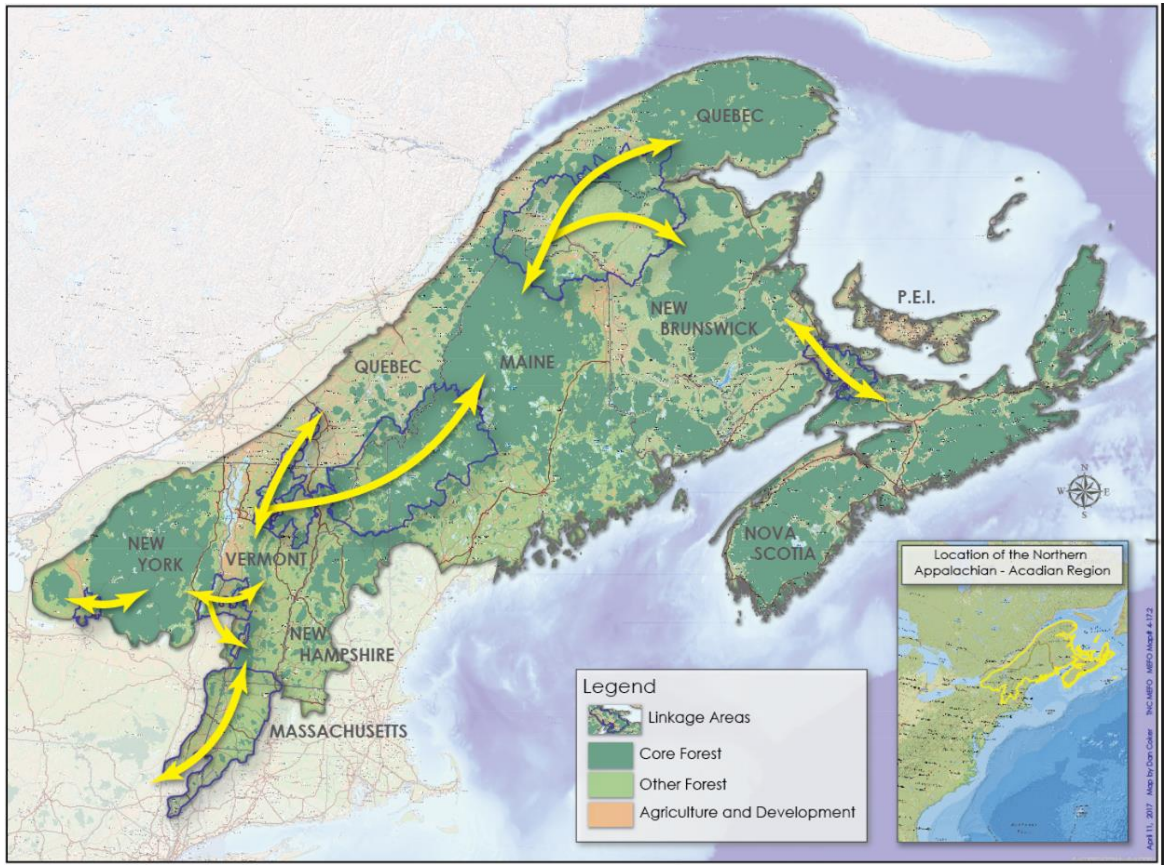
Forest Height: Average to Above Average

Human Disturbance: Average

Two Scales of Connectedness

Local Connectedness

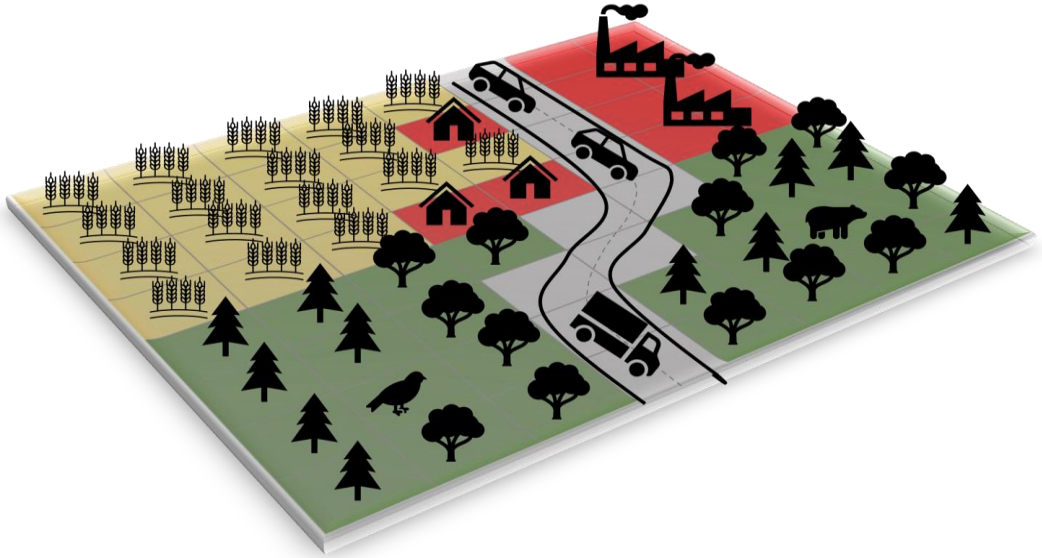
Regional Flow

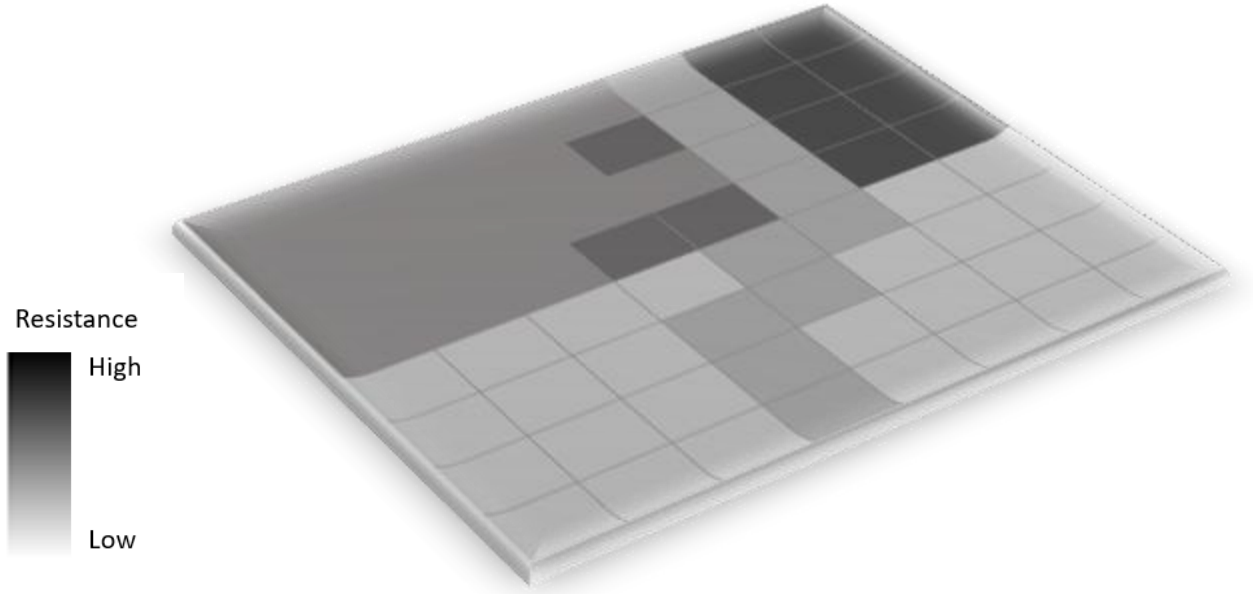


Connectivity for What?

STRUCTURAL CONNECTVITY

A measure of habitat permeability based on the physical features and arrangement of habitat patches, disturbances, and other landscape elements presumed to be important for organisms/seeds to move through the environment (modified from Hilty et al. 2019).



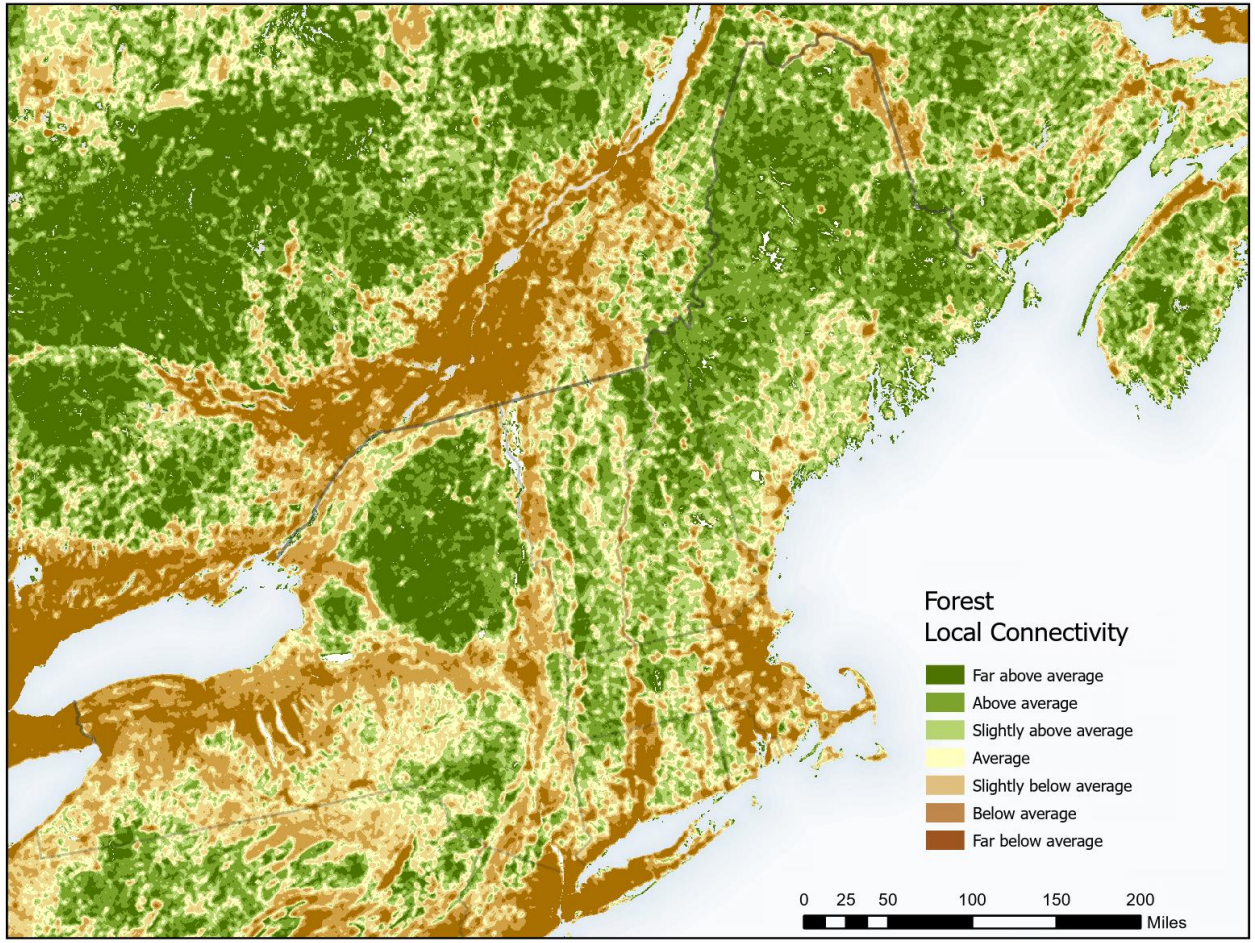


Resistance Grid

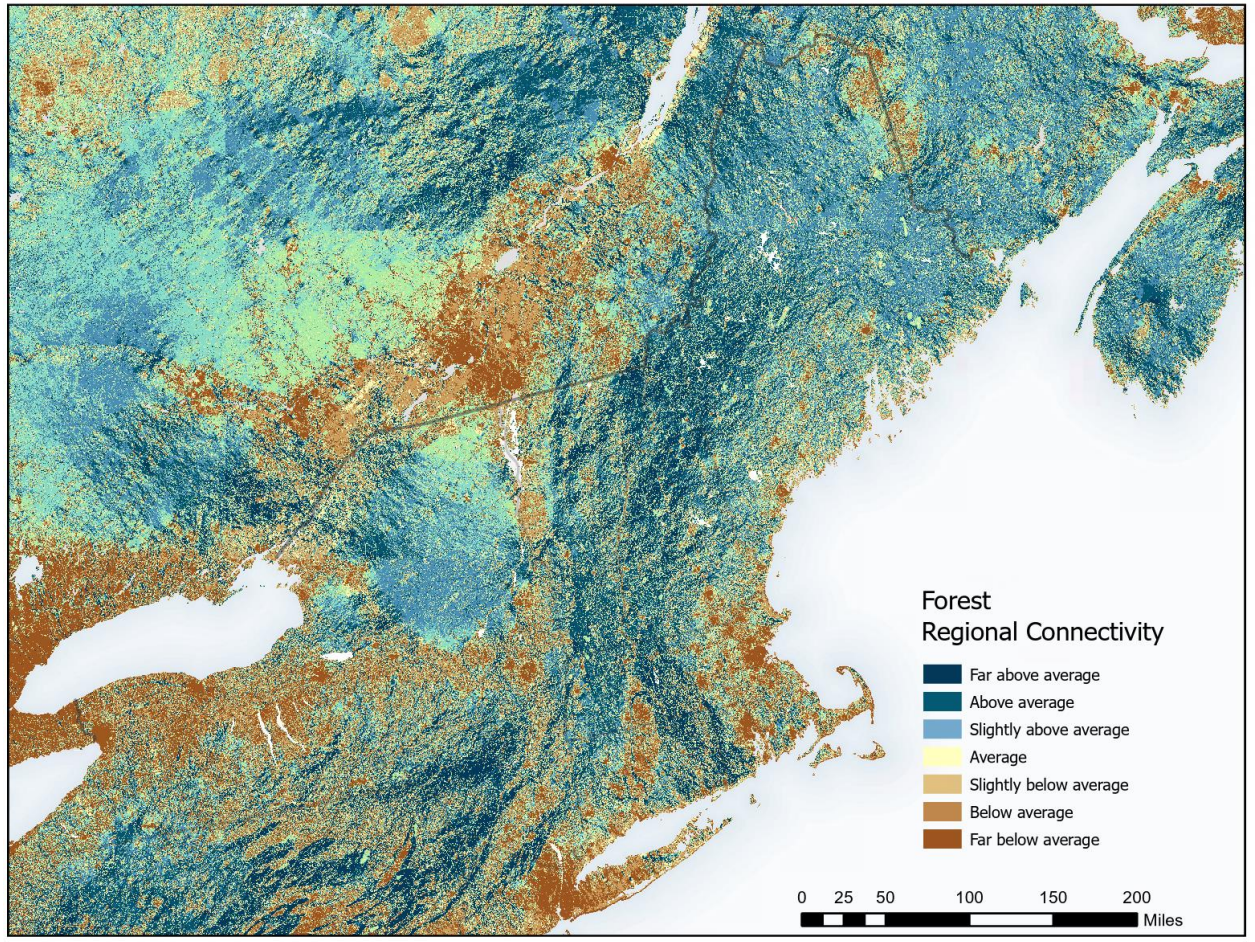
The resistance surface is the foundation of the modeling process, whereby land areas are assigned resistance (or cost) values representing the hypothesized relationship between ecological variables and the difficulty of species movement across that cell.

Forest Landuse Connectivity

Local Connectedness

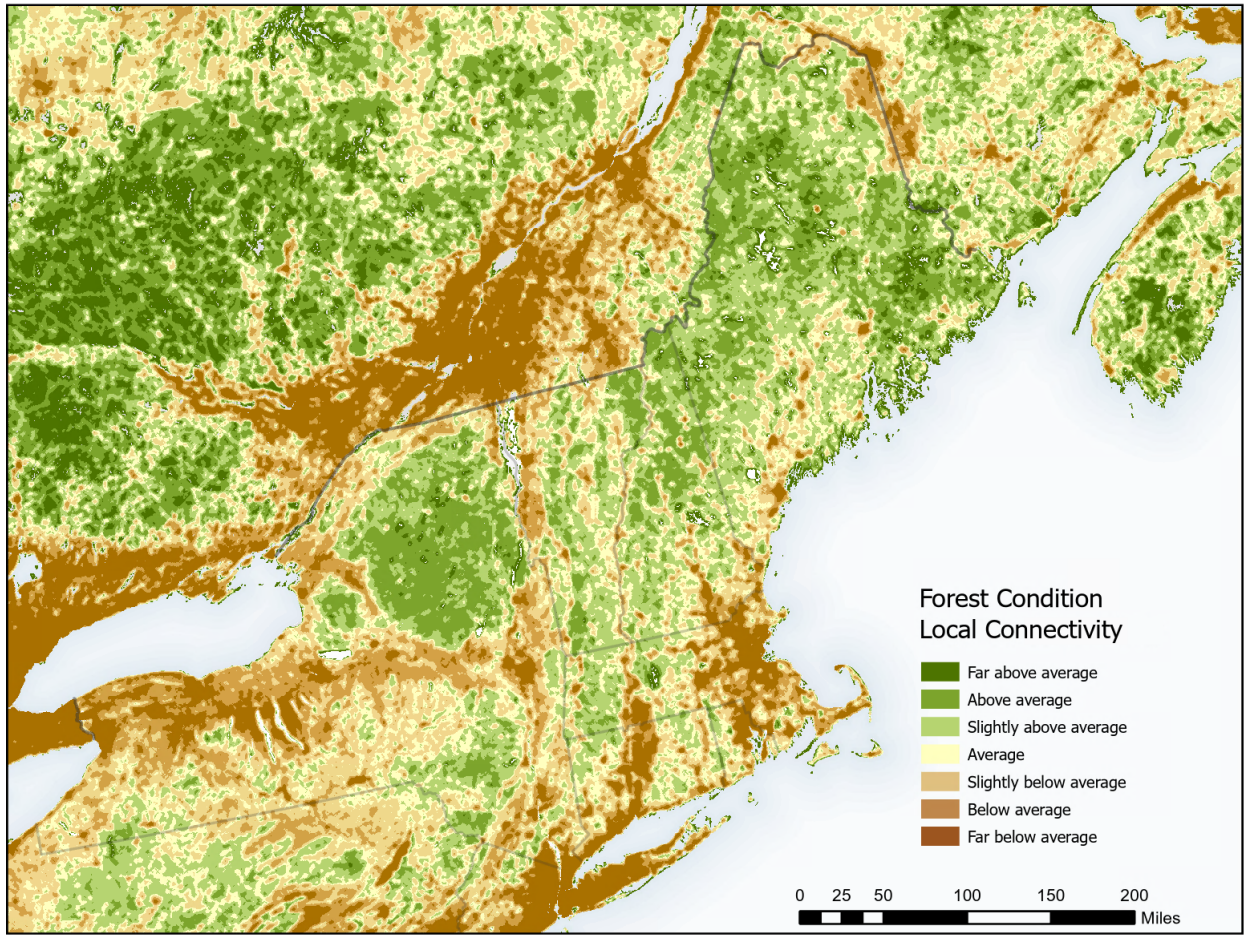


Regional Flow

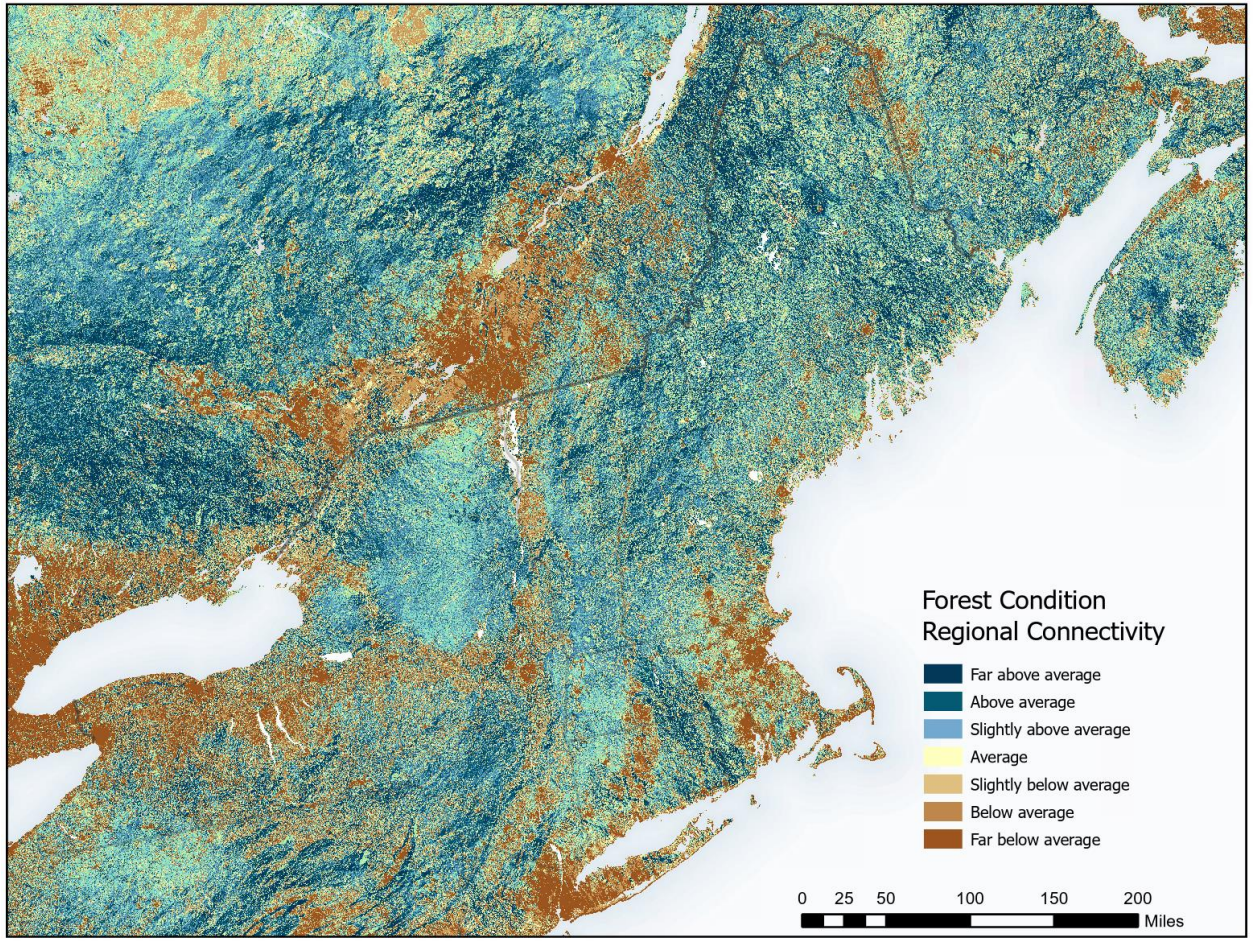


Forest Condition Connectivity

Local Connectedness

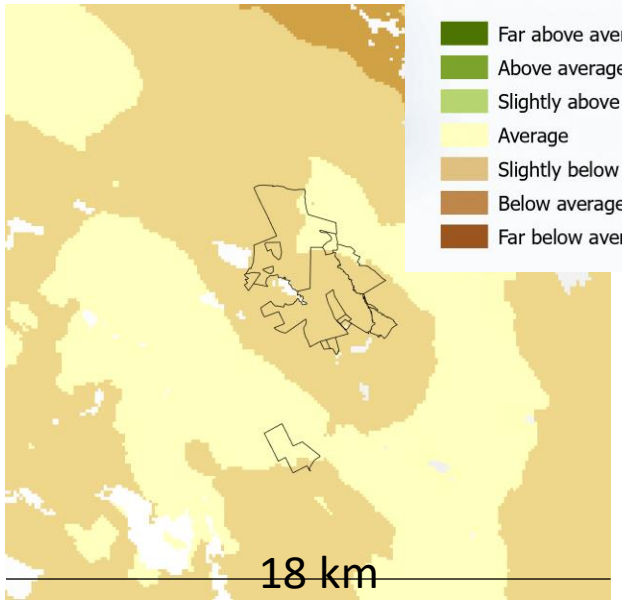


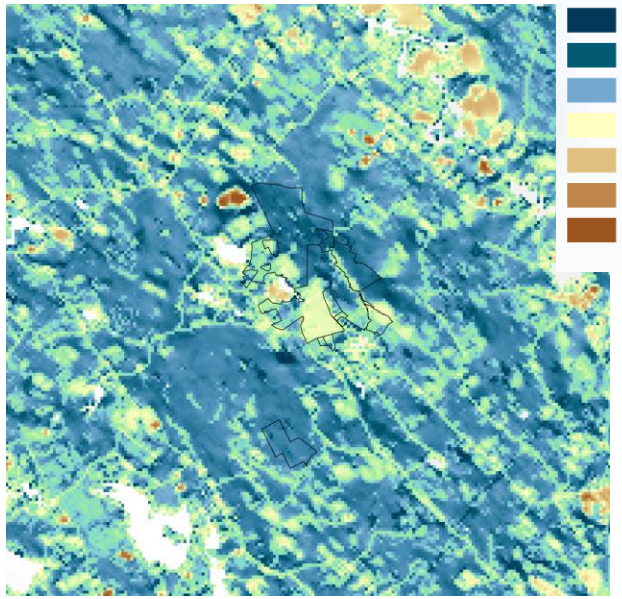
Regional Flow

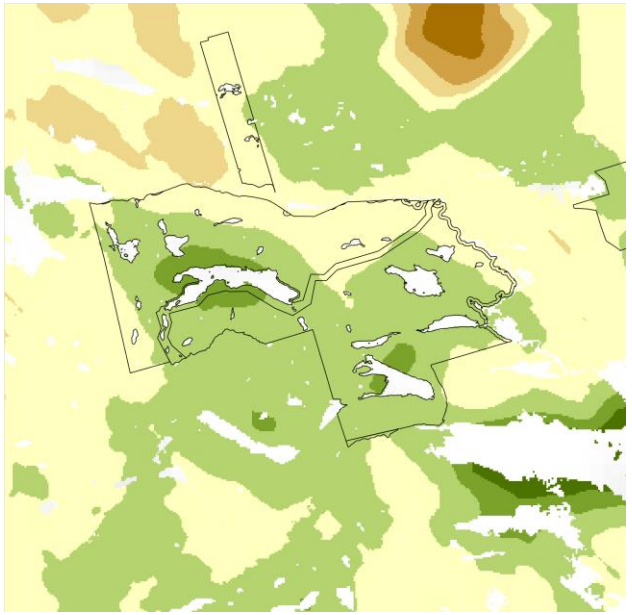


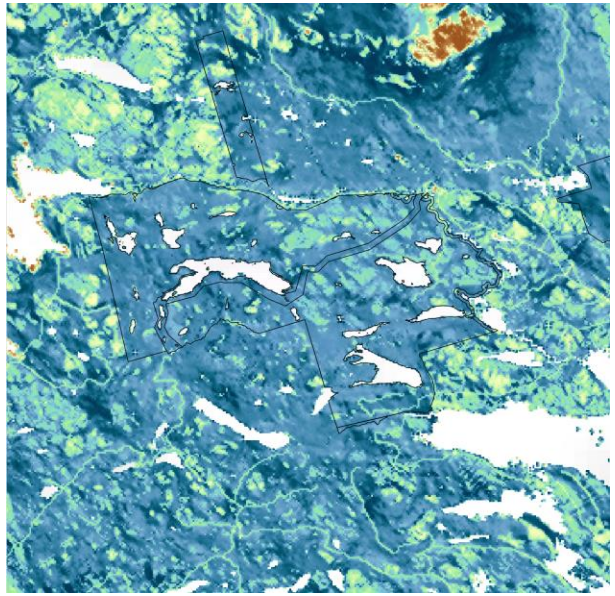
Local Connectedness

Regional Flow









Next Steps

- Report and Datasets completed end of December 2024
- Review from Steering Committee January 2025
- Map Viewer complete Winter 2025