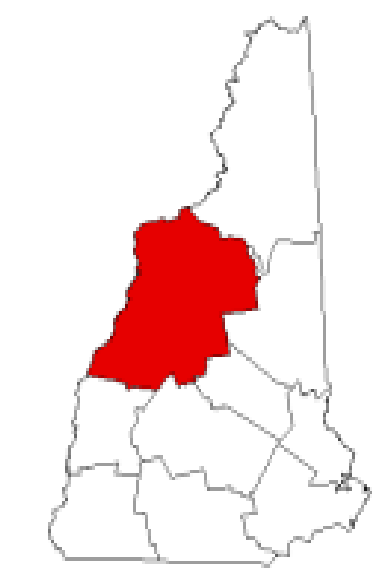
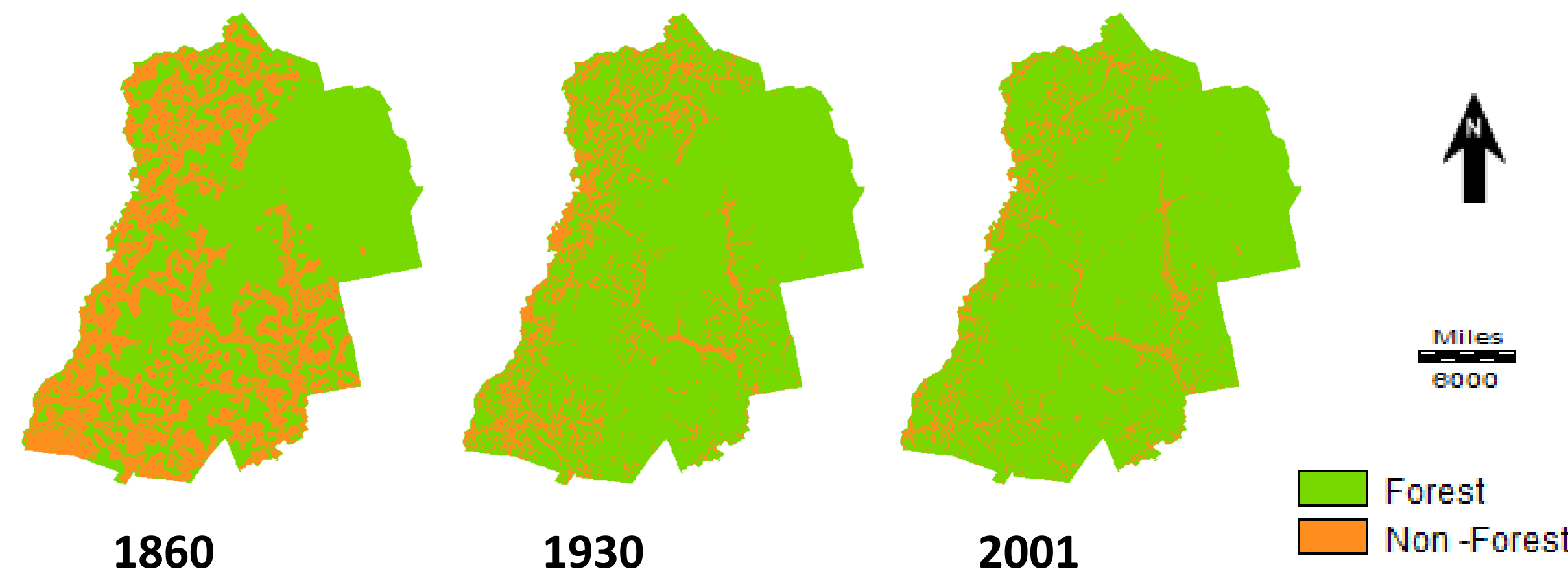


Introduction



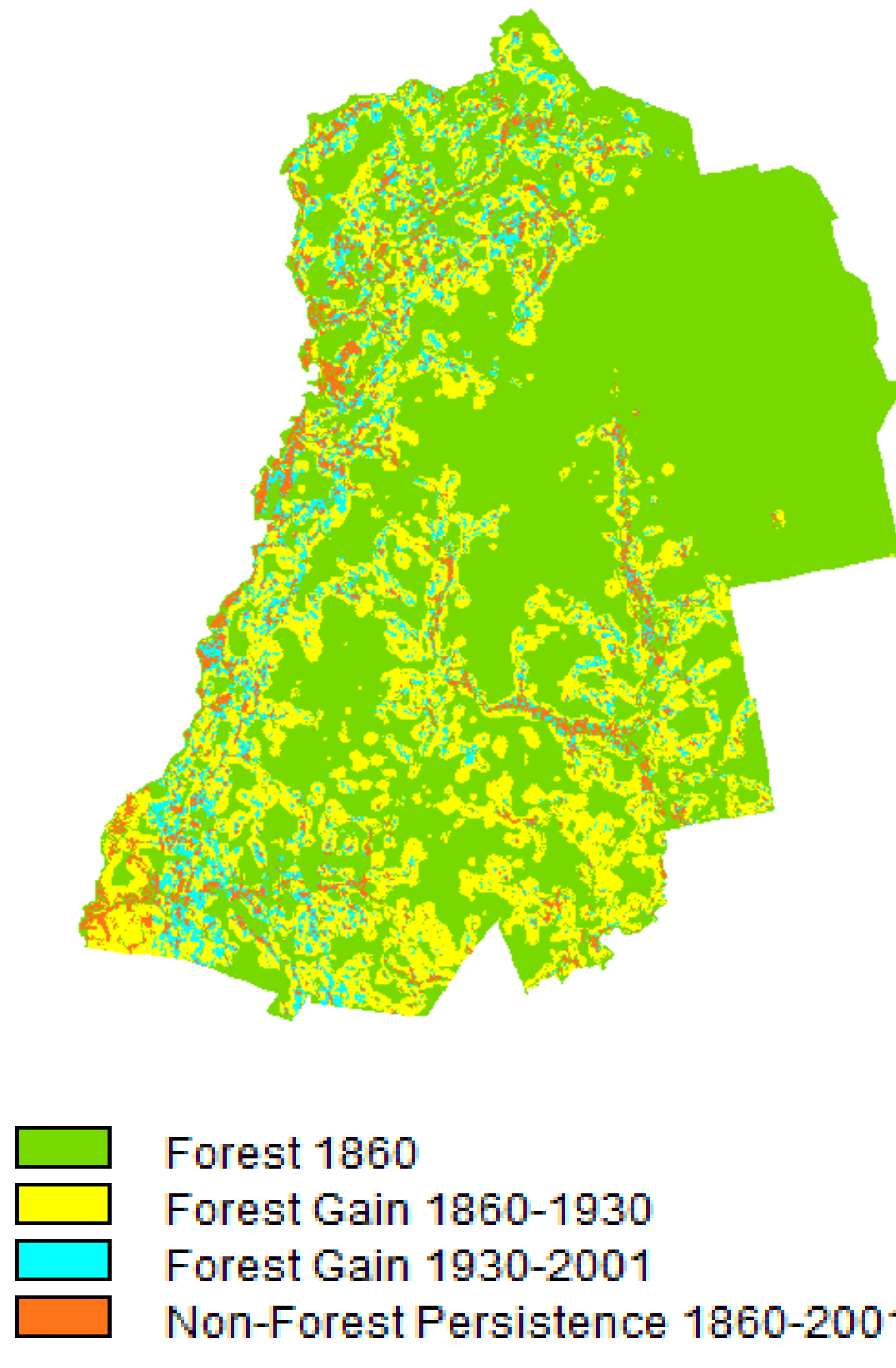
Study Area:
Hubbard Brook

Ecological gradient, such as topographic slope or distance to road, sometimes has a great impact on land change. This paper illustrates a type of gradient analysis with maps of forest versus non-forest for three points in time 1860, 1930, and 2001. The study area is Hubbard Brook, New Hampshire, where there has been substantial forest clearing before 1860 and substantial forest regrowth after 1860. The method reclassifies a continuous gradient into several bins as in a histogram, and then computes gross gains and gross losses of forest within each bin to analyze the land change process between the two time intervals: from 1860 to 1930 and from 1930 to 2001.



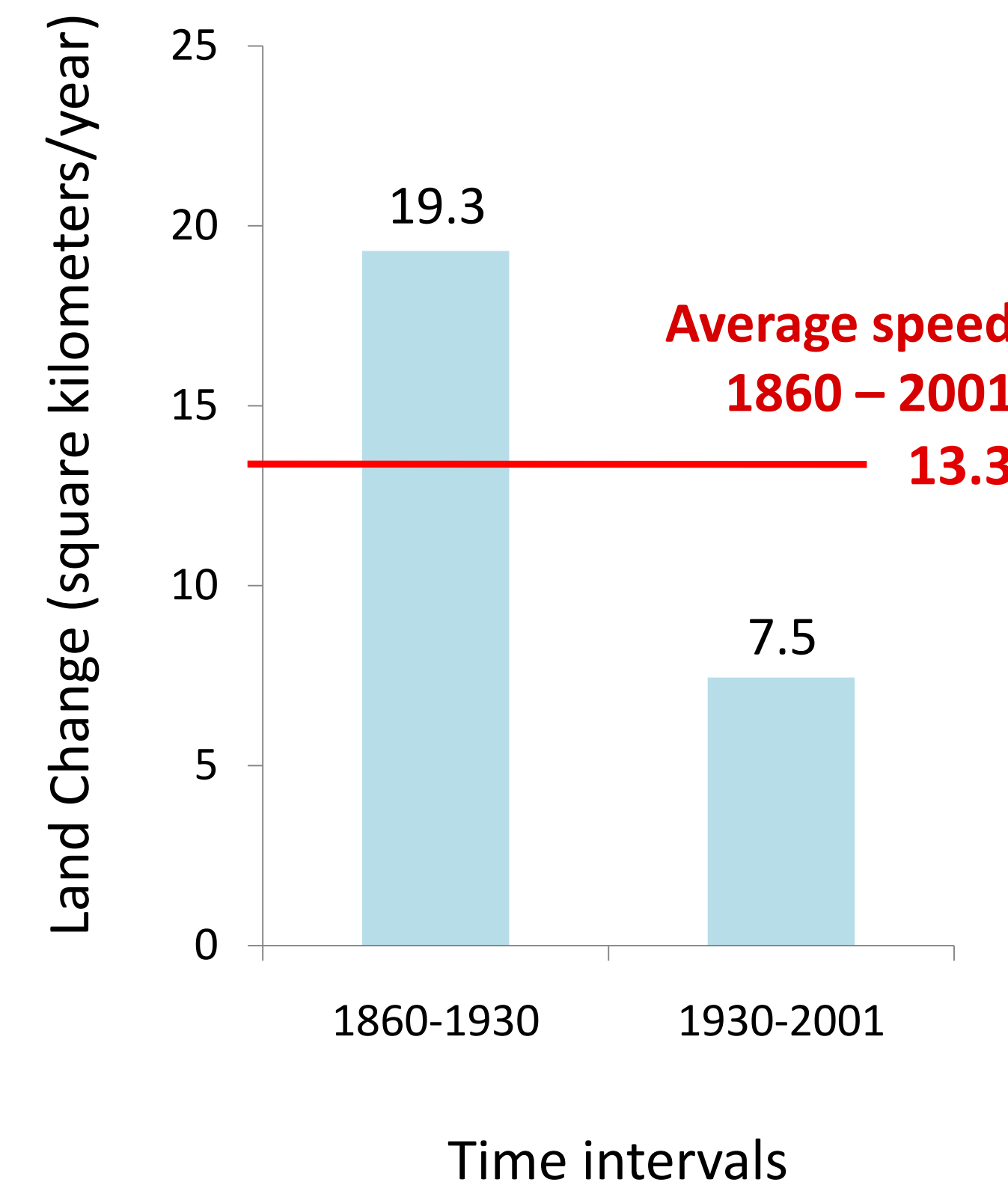
Maps

Combination of the Three Maps --- Gain of Forest

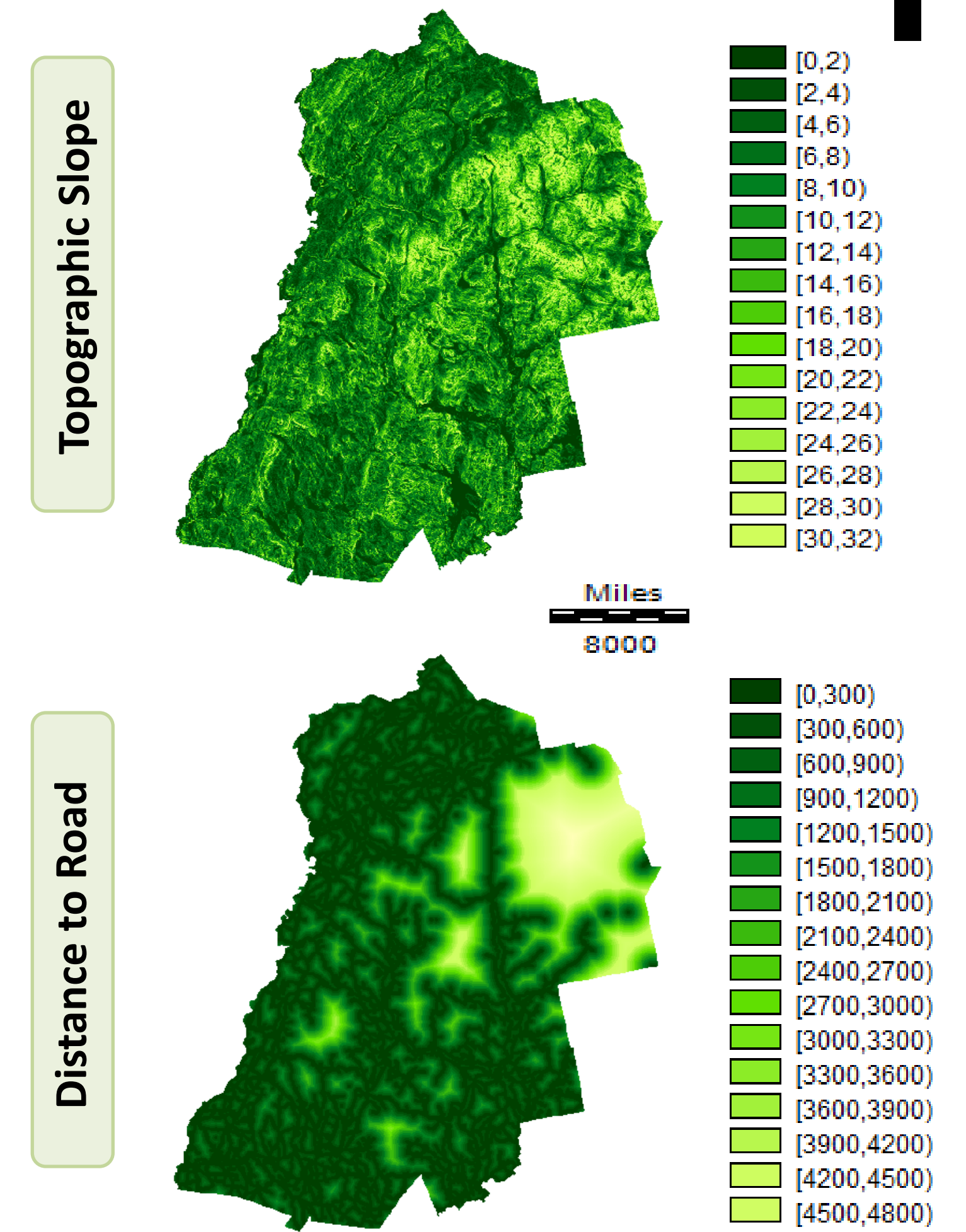


Results 1

Intensity of Annual Change

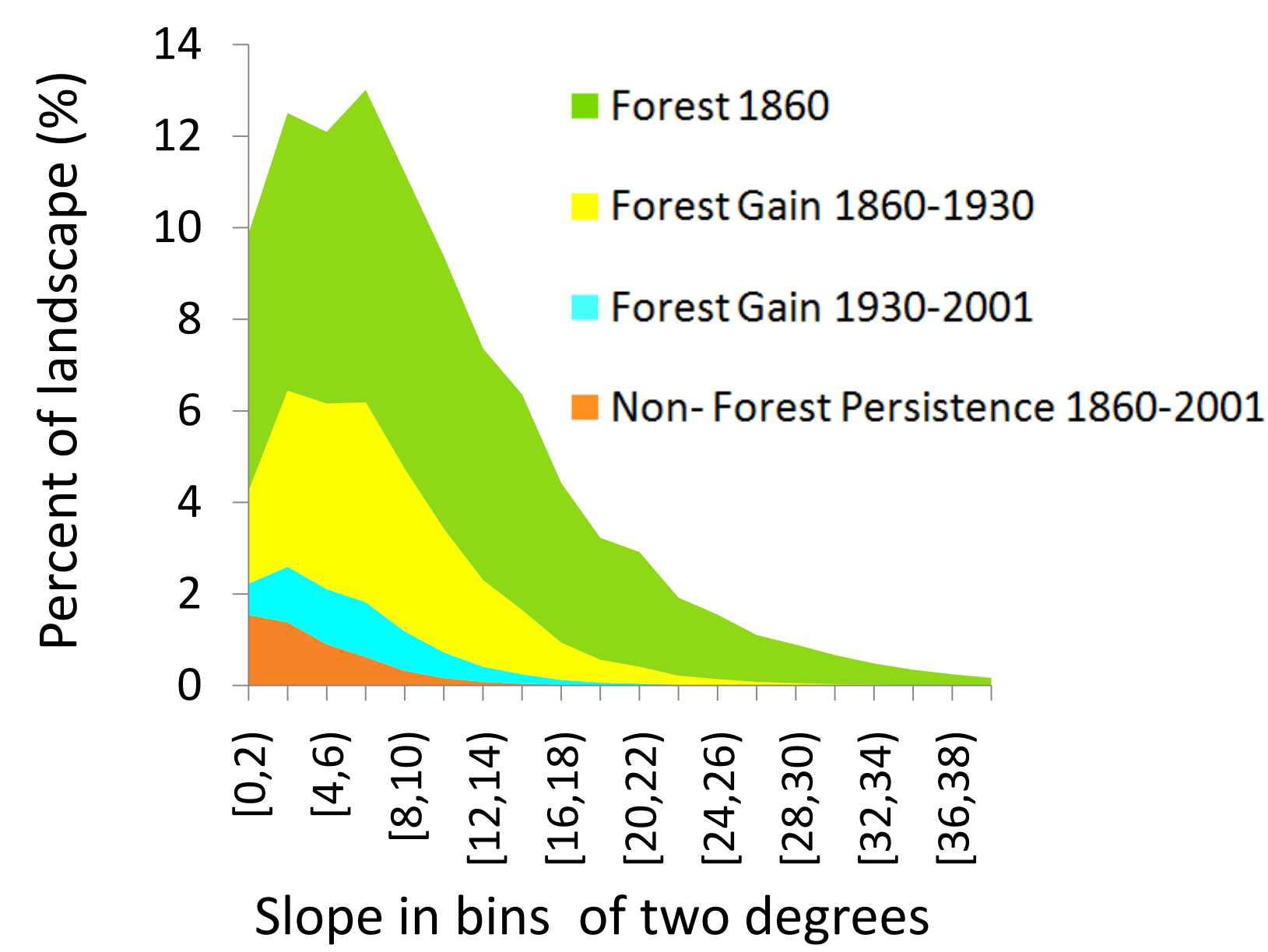


Ecological Gradients

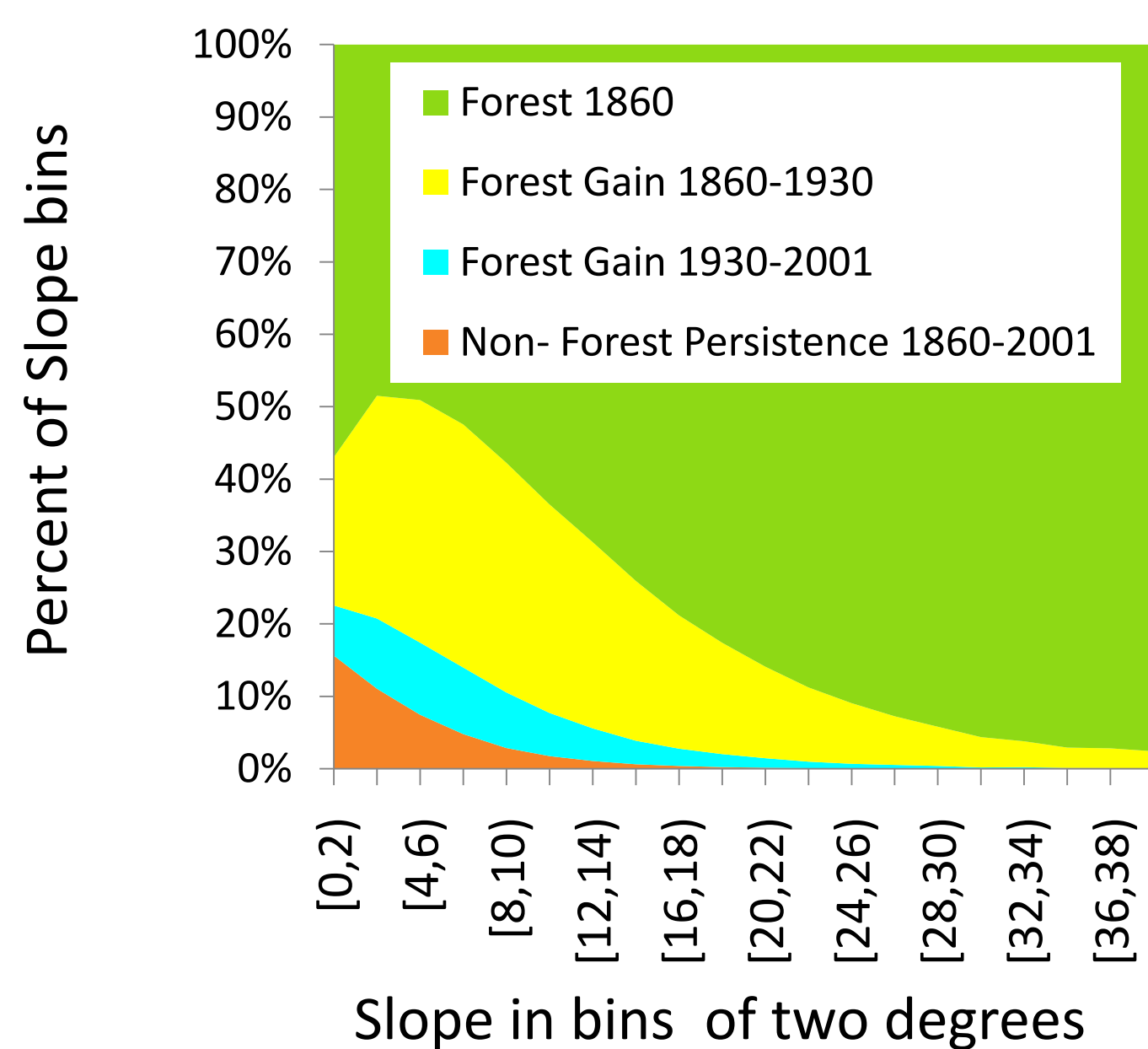


Results 2

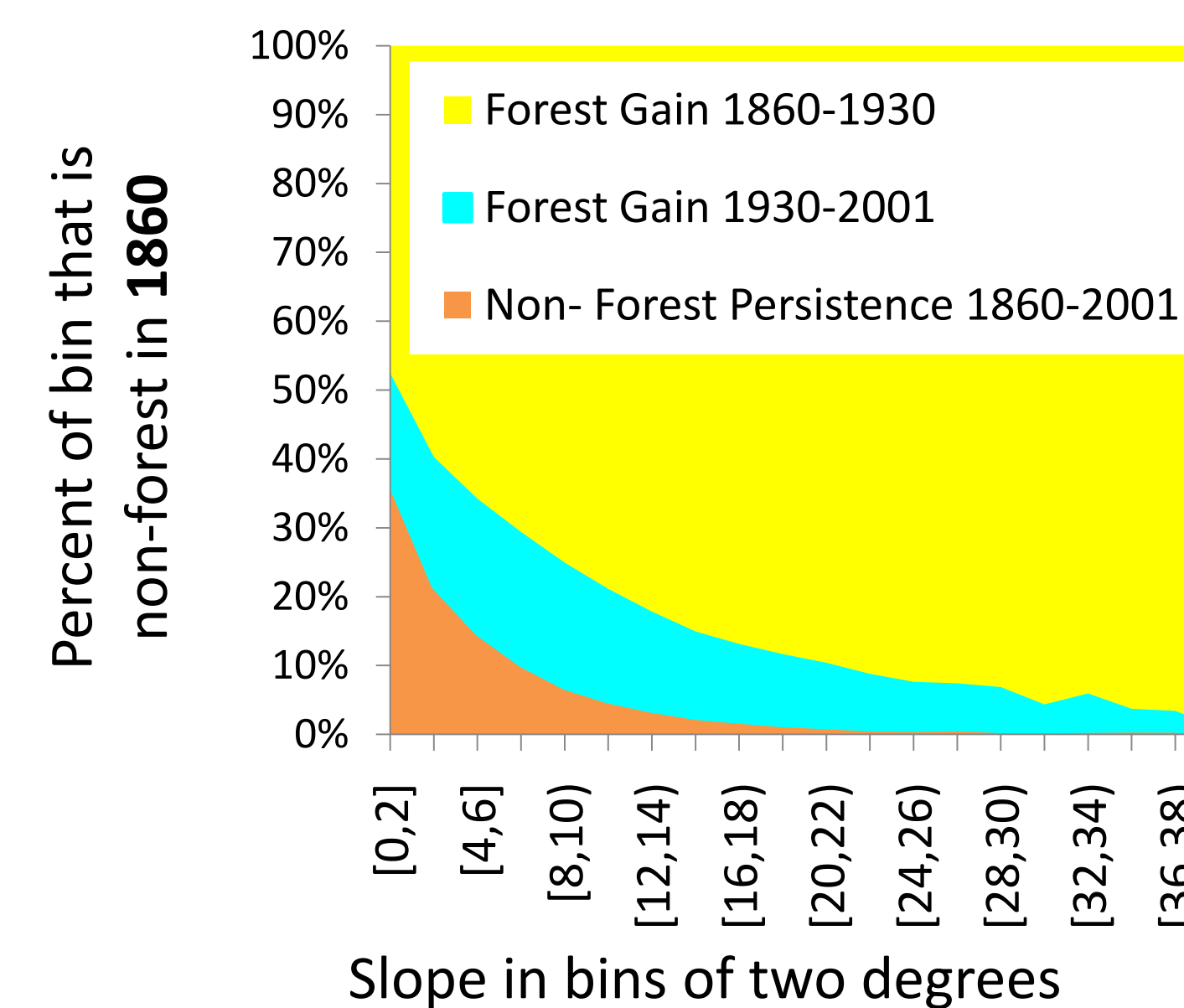
Percent of landscape along the gradient of slope



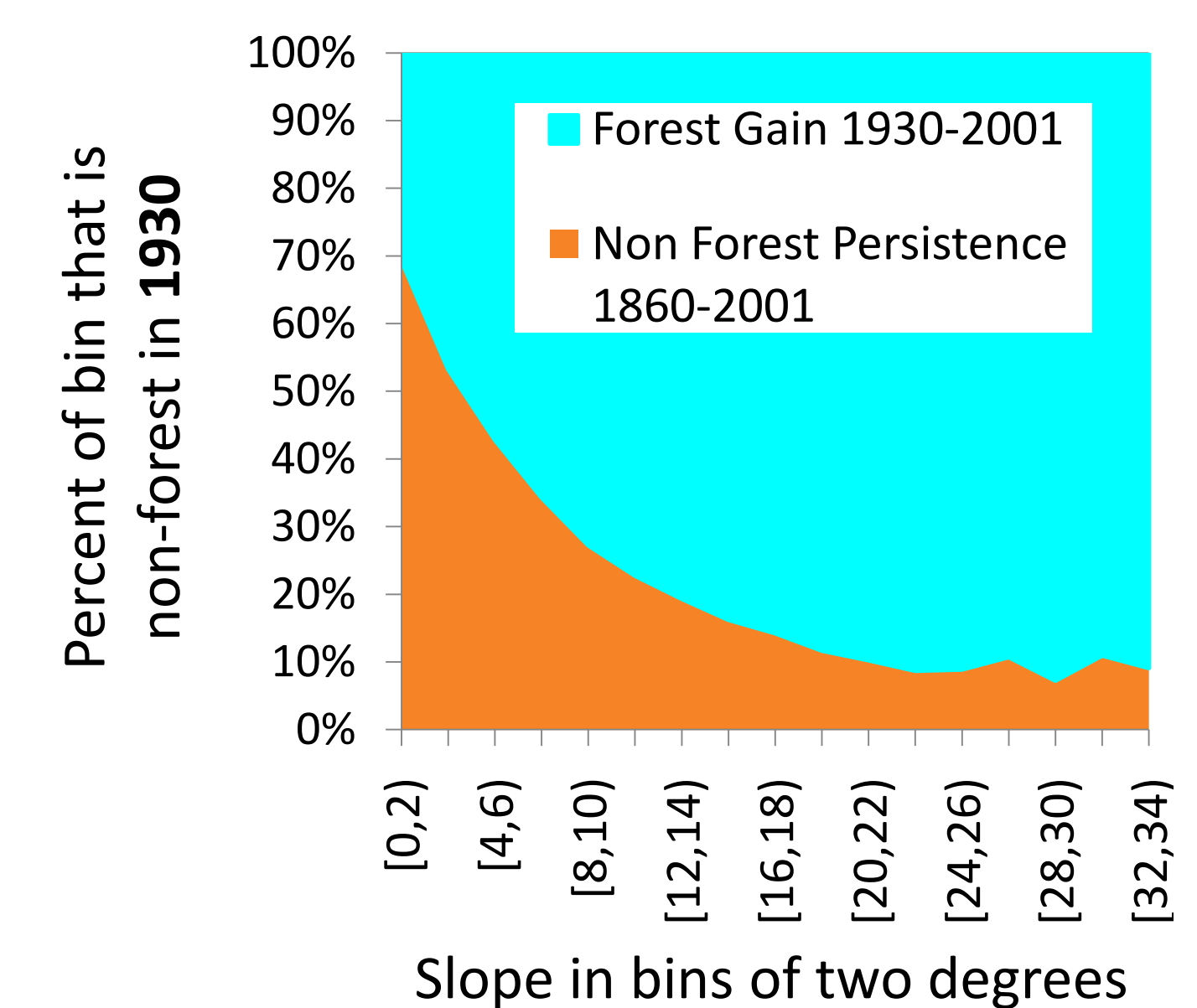
Percent of slope bin along the gradient of slope



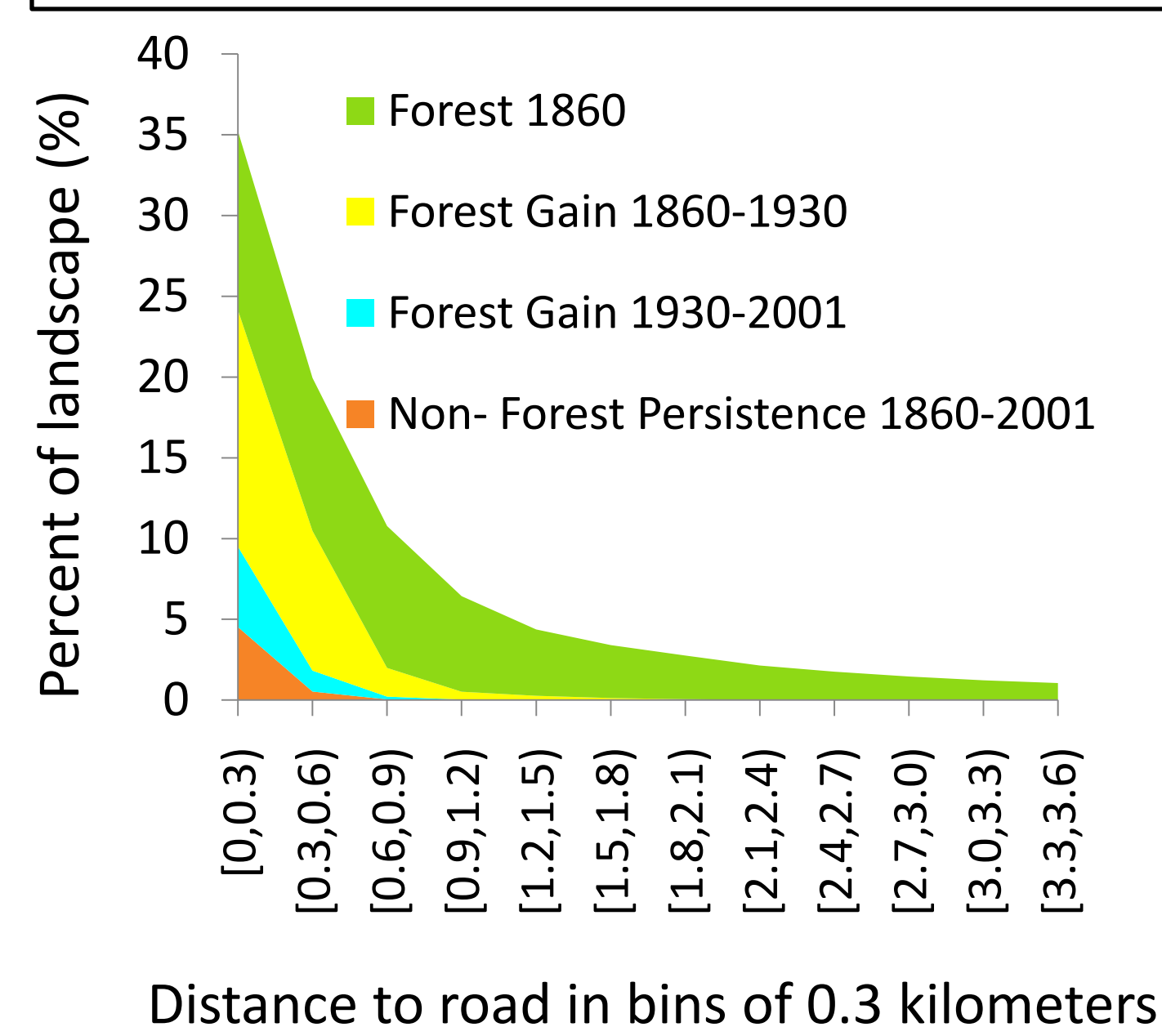
Percent of bin along the gradient of slope for Non-Forest of 1860



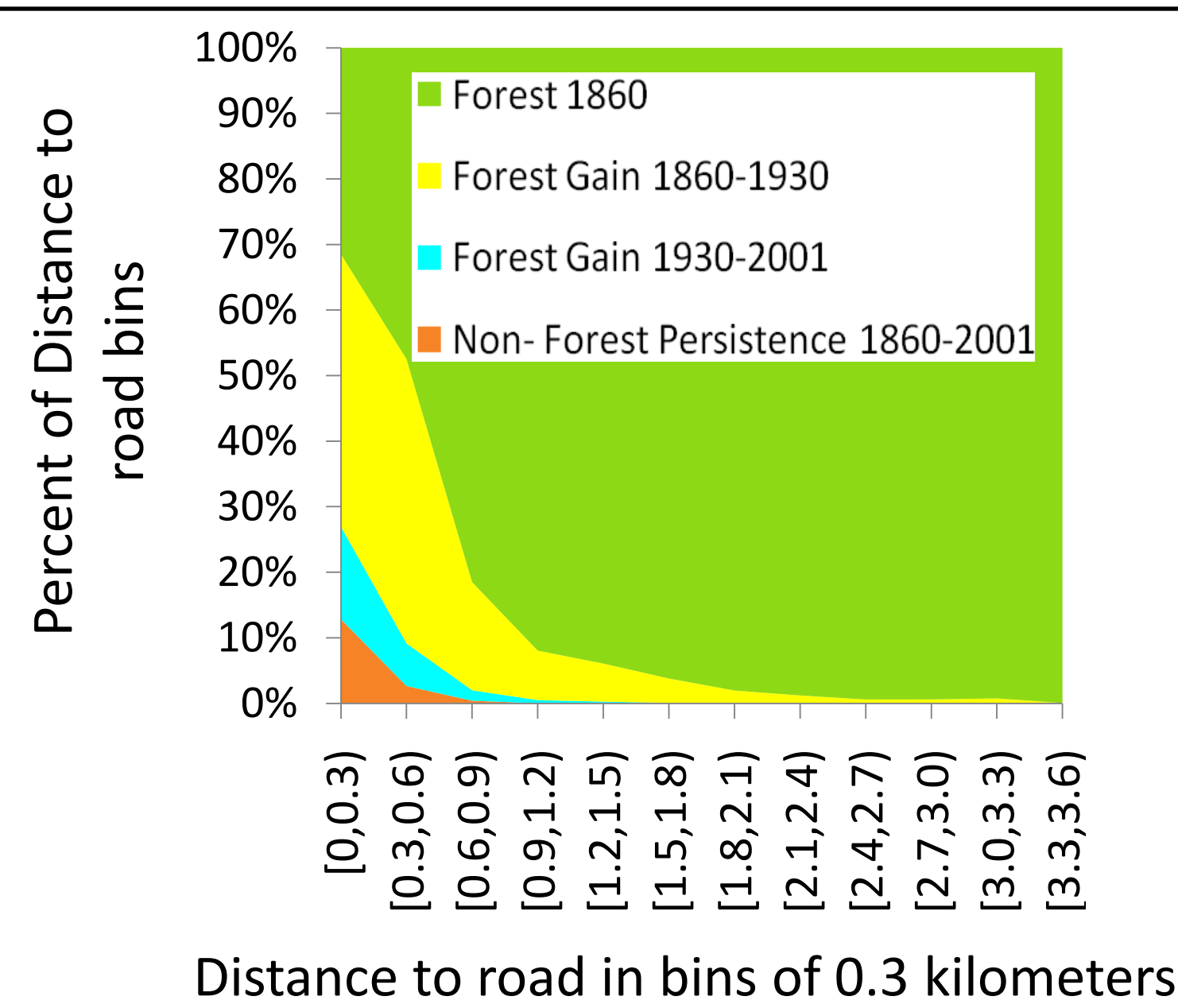
Percent of bin along the gradient of slope for Non-Forest of 1930



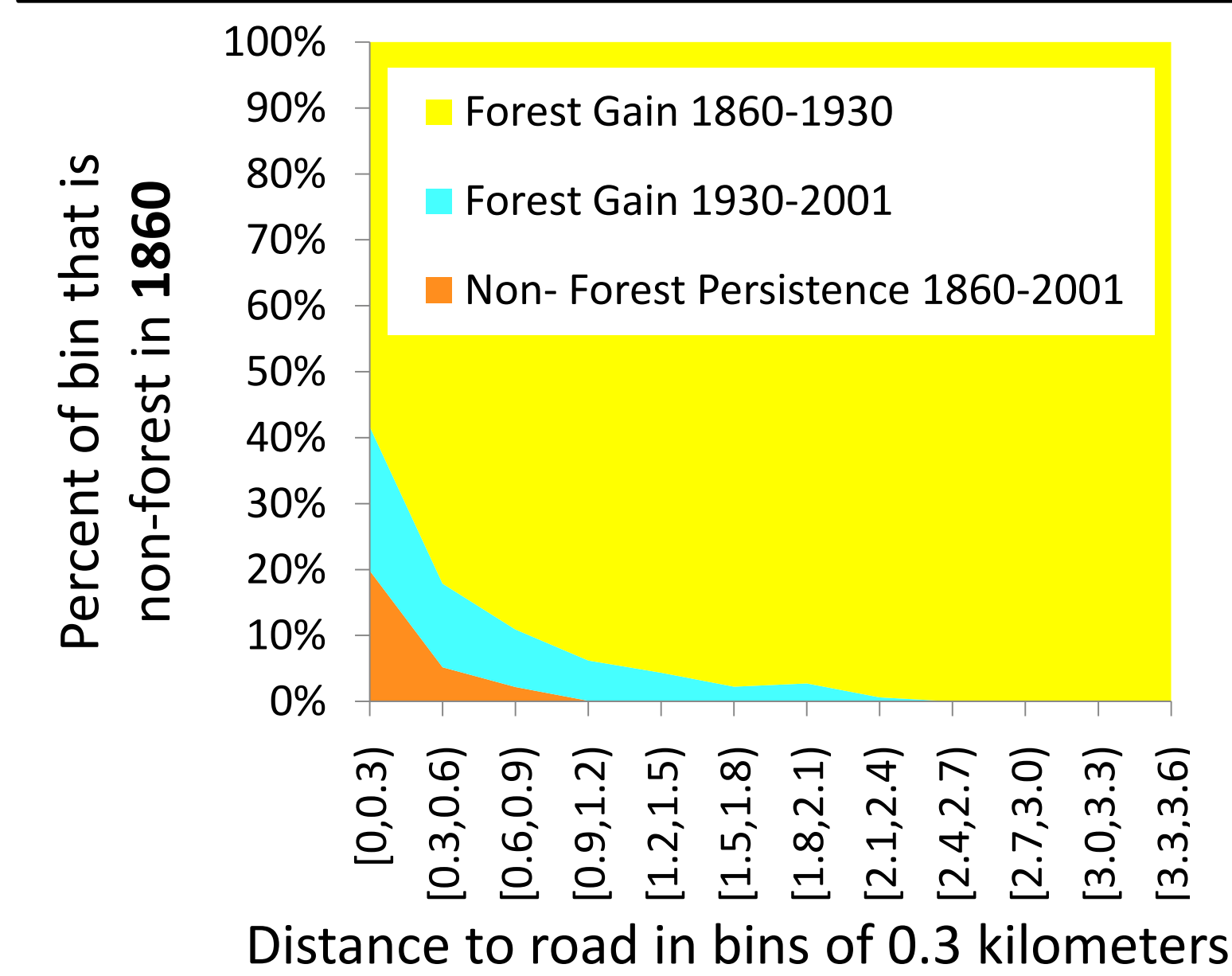
Percent of landscape along distance to road



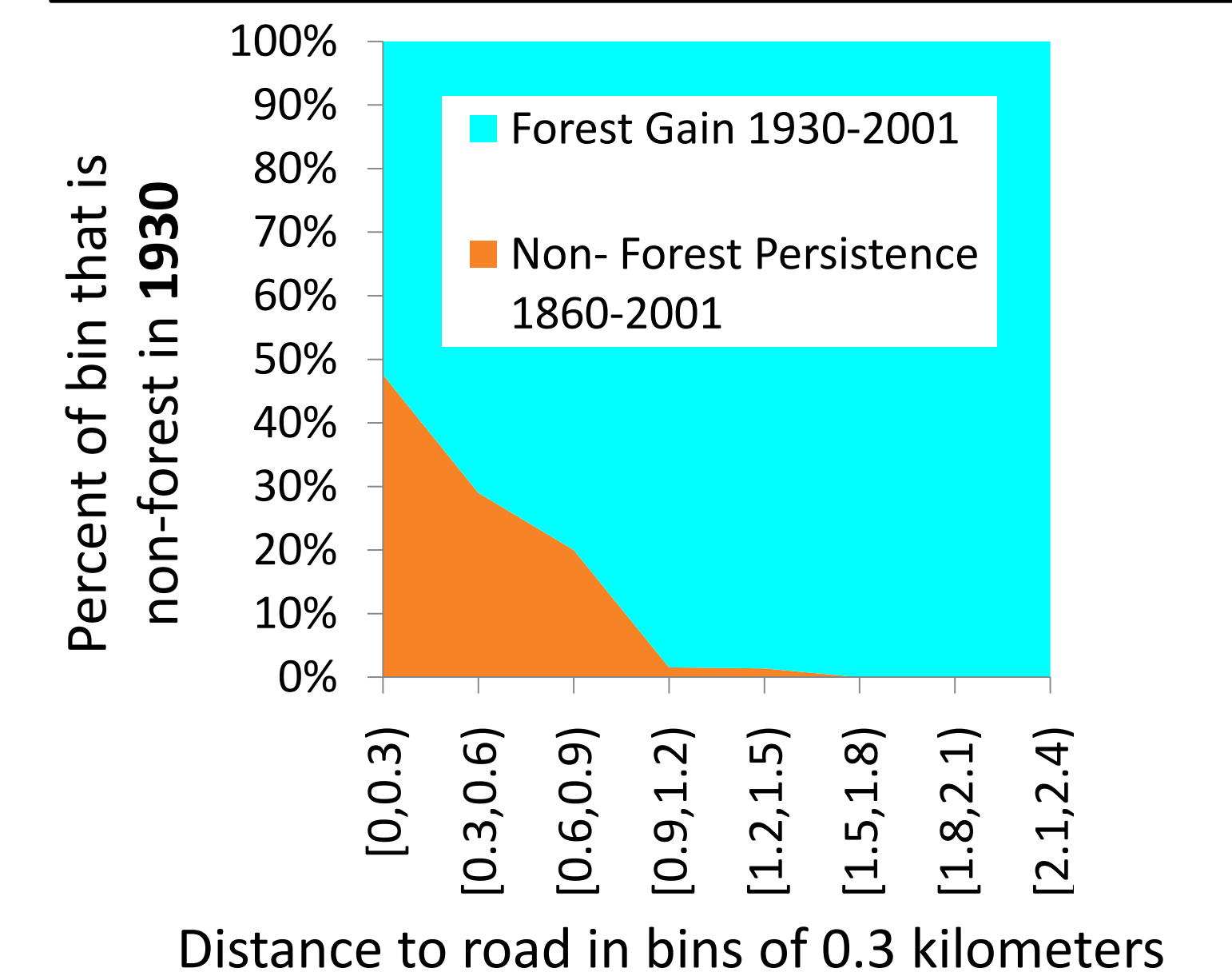
Percent of slope bin along distance to road



Percent of bin along distance to road for Non-Forest of 1860



Percent of bin along distance to road for Non-Forest of 1930



Acknowledgement

- The United States National Science Foundation supported this research through the Long Term Ecological Research (LTER) Network via supplement grant DEB-0620579 titled "Maps and Locals (MALS): A Cross-Site LTER Comparative Study of Land-Cover and Land-Use Change with Spatial Analysis and Local Ecological Knowledge".
- Professor Laura Schneider, State University of New Jersey, supplied the data.

Conclusions

- The annual speed of land change has decreased from the first time interval (1860-1930) to the second time interval (1930-2001).
- Prior to 1860, deforestation in Hubbard Brook, NH occurred on slightly steeper slopes rather than the flattest slopes. However, the most concentrated regrowth has been on steeper slopes for both time intervals.
- For distance to roads, the deforestation occurred in the areas closest to the roads. However, the most concentrated regrowth has been on areas more distant from roads. This pattern has occurred in both time intervals.