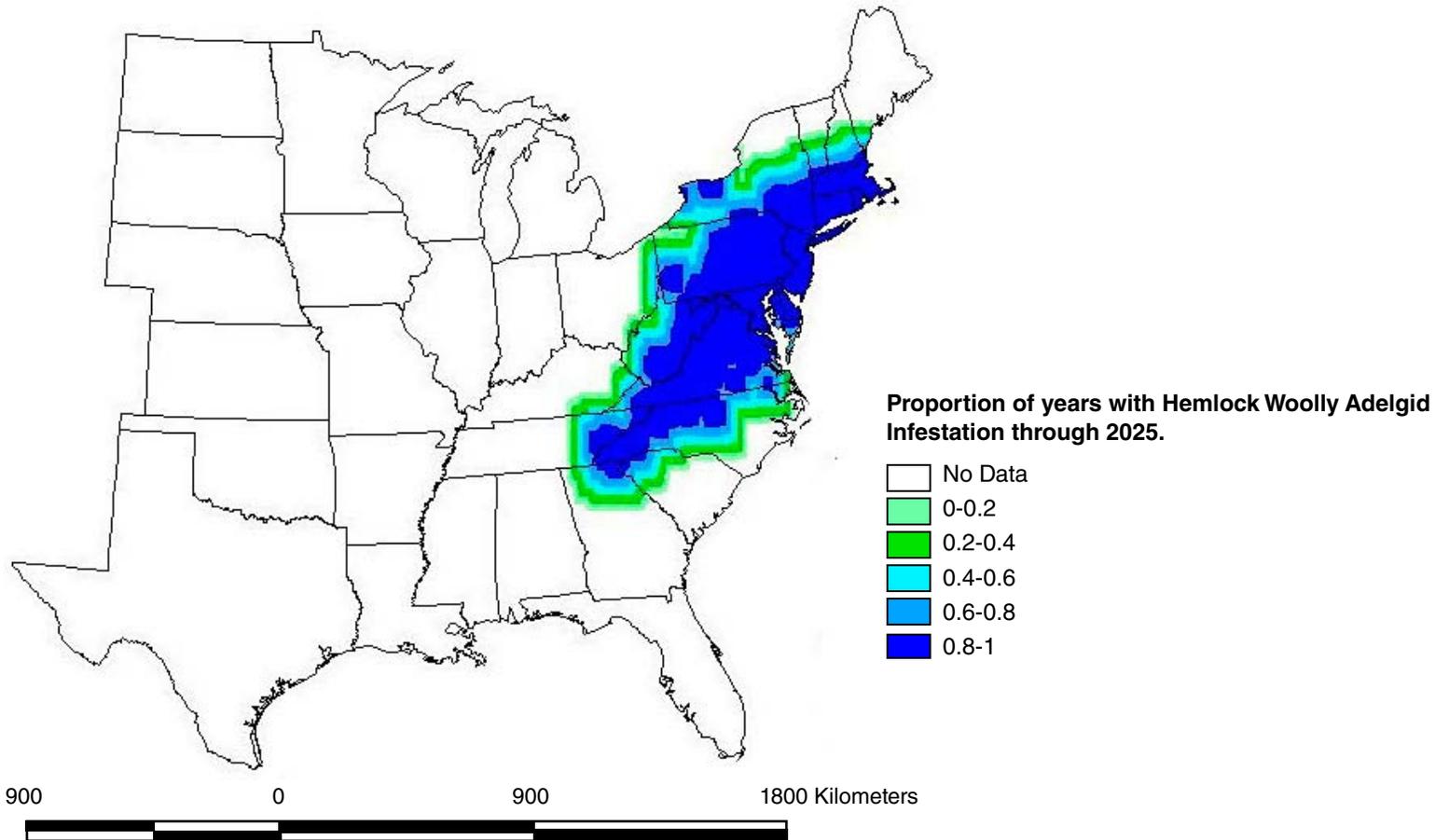


Hemlock Woolly Adelgid Predicted Range Expansion

A spatial representation of the predicted future range expansion for hemlock woolly adelgid was created by estimating spread rates from historical records and using these estimates to predict future spread. Presence was based upon visual detection of life stages by pest management personnel. Historical records were available for 1951, 1971, 1980, 1990, 1995, 2001, and 2002. A GIS was used to calculate the minimum distance of each county to the area initially infested. The rate of spread was estimated as the slope of the least squares linear regression model describing the relationship between each county's distance from the initially infested area and the time until the pest was established in the county. Due to the visibly anisotropic spread of hemlock woolly adelgid (Souto et al., 1996), the minimum distance of each county to the area initially infested was measured separately in the east/west- and north/south-direction. Thus, two linear models of the distance of the county as a function of its time of first infestation were used to estimate two spread rates. Historical spread of hemlock woolly adelgid in the east/west direction was estimated at $3.6 \text{ km/year} \pm 0.2 \text{ km/year}$ ($r^2=0.60$) and in the north/south direction was estimated at $5.8 \text{ km/year} \pm 0.28 \text{ km/year}$ ($r^2=0.66$).

Souto, D., Luther, T., Chianese, B., 1996. Past and current status of HWA in eastern and Carolina hemlock stands. In: Salom, S.M., Tignor, T.C., Reardon, R.C. (Eds.), Proceedings of the First Hemlock Woolly Adelgid Review, USDA For. Service, Morgantown, WV, pp. 9-15.



Map Produced by:
USDA Forest Service
Randall Morin
Northeastern Research Station