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MCM 591
GIS for Conservation Medicine

Data Sources: ESRI, PASDA, NLDC, American Community Survey
NAD 1983 Pennsylvania State Plane South

Tufts University | Cummings School of Veterinary Medicine

SHEDDING LIGHT ON LANTERNFLY

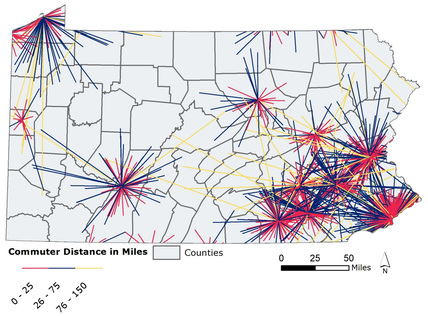
A Risk Assessment of *Lycorma delicatula* in Pennsylvania

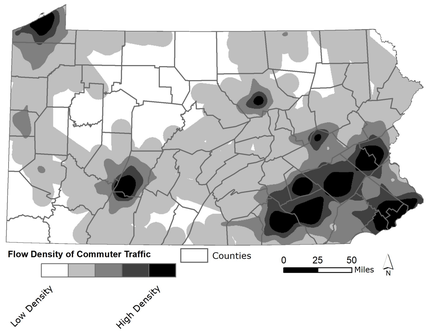
Introduction

Lycorma delicatula (spotted lanternfly) is a pest insect that was accidently introduced to the United States in 2014. In North America, the spotted lanternfly was first discovered in Berks County, Pennsylvania and was thought to have migrated from Asia through the import of ornamental plants . Currently, *L. delicatula* has populated Southeastern Pennsylvania and has also been found in New York, New Jersey, Delaware, Maryland, and Virginia. Due to the insect's ecology and humans' lack of knowledge, dispersal of egg masses is commonly transported by vehicles (general public driving, and commercial horticulture shipping) into other geographic areas. The spotted lanternfly commonly feeds on a variety or ornamental trees as well as fruit trees and grapevine, often causing irreparable damage to the host plants. In Pennsylvania, the agriculture industry brings in an approximately 18 billion dollars of revenue, making the lanternfly detrimental to job security and livelihoods . There is an incredible need to investigate the insect's ecology and feeding behavior as well as human mediated factors such as transportation to evaluate the potential risk of *Lycorma delicatula.*

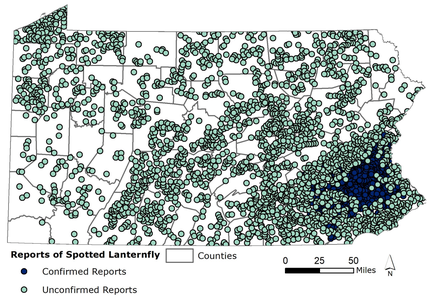
Risk Assessment Data

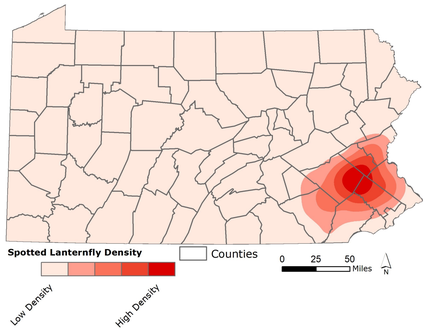
Commuting Data



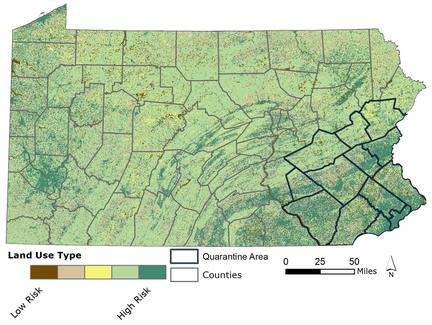


Spotted Lanternfly Data

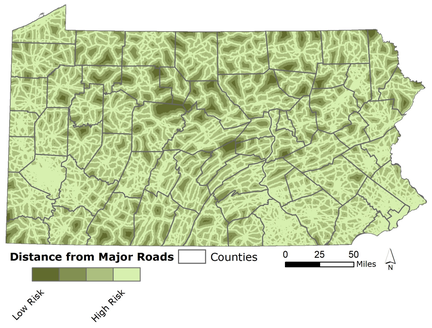




Land Use Data

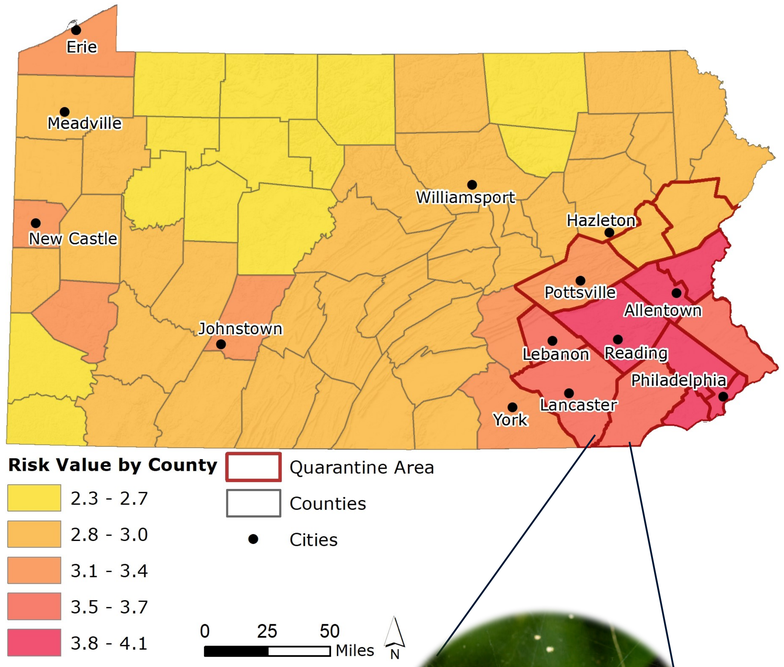


Major Roads Data

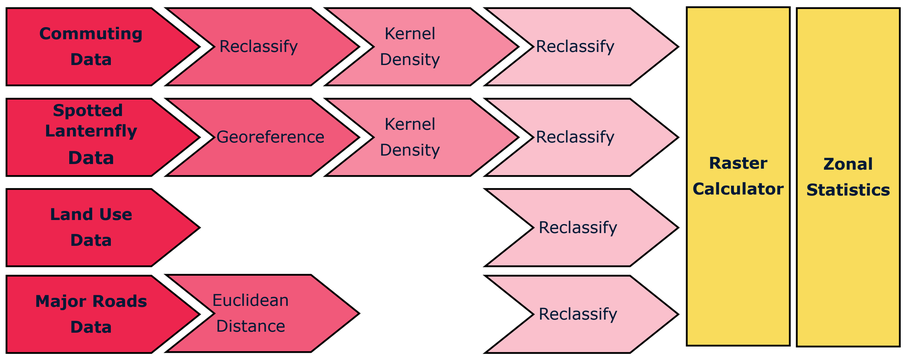


Factors	1 Negligible Risk	2 Low Risk	3 Moderate Risk	4 High Risk	5 Extremely High Risk
Land Use Type (*.3)	Water, ice, barren, scrub, shrub, grassland, sedge	Pasture, emergent wetlands	Evergreen forest, woody wet-lands	Deciduous forest, mixed forest	Developed land, crops
Distance to Highways (*.233)	>10 miles	5-10 miles	2-5 miles	.5-2 miles	< .5 mile
Commuting Flow (*.233)	23,564 (Quantile)	28,982 (Quantile)	52,223 (Quantile)	252,568 (Quantile)	111,993 (Quantile)
SLF Density (*.233)	42,415 (Jenks)	66,177 (Jenks)	118,351 (Jenks)	178,139 (Jenks)	4,646,176 (Jenks)

Table 1. Risk Factor Criteria



Methodology



Conclusions

Risk value was calculated for each county by performing a weighted analysis using raster calculator and zonal statistics (see above table for risk factor criteria). Counties with values of extremely high risk (3.8-4.1) and high risk (3.5-3.7) were found to be located within the existing spotted lanternfly quarantine area. This quarantine area follows certain protocols in surveillance of vehicles leaving and entering the quarantined counties. Although counties of highest risk value are already in quarantine, analysis showed that many counties of moderate risk do not have surveillance protocols in place. Referring to georeferenced spotted lanternfly data, it is clear that citizens are reporting *L. delicatula* sightings statewide. This spatial analysis gives insight to the potential spread of *L. delicatula* while regarding unintentional translocation due to human transportation and commuting. This assessment also shows that management plans are feasible as many counties do not have high risk values.

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