

# Effects of contemporary landscape patterns and land-use change on non-native invasive plants in western North Carolina

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## Background/Question/Methods

Non-native invasive plants increasingly pose a threat to the forests of eastern North America. Both contemporary and historic land use may influence the spread of invasive plants by altering landscape patterns, soils, and biotic communities. Like much of eastern North America, the southern Appalachians have experienced considerable land-use change over the past century. Extensive agricultural land abandonment and timber harvest was followed by the regrowth of forests that characterize the region today. In recent decades there has been a rapid increase in exurban and rural development, often accompanied by expansion of road networks in areas of previously intact forest. We addressed the following question with respect to non-native plant invasion across four western North Carolina counties: What factors related to contemporary land use, land-cover change, and development history influence the distribution and abundance of non-native invasive plants among watersheds? We conducted roadside surveys in 25 watersheds throughout the region that span a range of forest cover and development. We measured the abundance of 15 target invasive species capable of spread into forested areas.

## Results/Conclusions

Invasive species were present in all watersheds with a mean abundance of 16% cover (range=1.8-32%). Four species (*Lonicera japonica*, *Rosa multiflora*, *Microstegium vimineum*, and *Celastrus orbiculatus*) accounted for over 80% of the invasive cover. Regression tree analysis was used to explain abundance of the invasive species among watersheds. Explanatory variables included forest cover, edge density, forest regrowth since the 1940s, building density, road density, change in building density since the 1940s, and distance to city center. Results suggest that distance to city center is important in explaining abundance of the most common invasive species, with abundance decreasing with distance from Asheville, NC. Greater forest edge density explained higher abundance of several species. Abundance of several species was also greater in areas with higher building density. Overall, results suggest that factors related to landscape pattern and contemporary land use influence invasion at the regional scale. Disentangling the factors that determine invasibility poses a challenge, but it can offer insight into the invasion process and help identify areas of greatest risk.