Landscape patterns matter

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The size, shape, and arrangement of fields, forests, wetlands, and human populations, and the ways these and other features interact and change across landscapes, have a multitude of implications for resource sustainability, ecosystem health, habitat connectivity, and other societal values. To fully understand the effects of these landscape patterns, we first need to know how to measure them.

A special issue of the journal *Landscape Ecology* was organized by scientists at the USDA Forest Service and North Carolina State University brings focus to the science of landscape pattern analysis. "The special issue demonstrates that research on landscape patterns remains an essential and vibrant topic in the field," said Jennifer Costanza, lead editor of the issue and faculty at NCSU.

Appearing three decades after the first scientific papers on landscape patterns were published, the special issue includes 14 articles by scientists tackling current problems in the field, introducing new approaches, and suggesting promising research directions and applications.

The September 2019 special issue, "Describing and analyzing landscape patterns—where are we now, and where are we going?", is now available online.

"The inclusion of research reviews and editorials along with reports of cutting-edge developments puts the new research into perspective," says Kurt Riitters, a Forest Service scientist with the Southern Research

Station who co-edited the special issue.

The issue reflects two parallel, complementary approaches in the development of landscape pattern measurement: the search for general methods that can be applied to a wide range of studies, and the search for specific methods tailored to a certain place or type of landscape change.

For example, a study by Southern Research Station scientists Bjorn-Gustaf Brooks and Danny Lee applies a new metric for rapidly scanning large areas using remote sensing to detect patterns that suggest important forms of disturbance in natural landscapes. In contrast, a simulation study by Robert Corry of the University of Guelph focuses on the patterns created by agricultural crop rotations in southern Ontario.

"Both of these approaches in tandem will be important for comprehensive monitoring of landscape change and assessing the consequences for sustainability" says Costanza. "Today, scientists and land managers have faster access to more maps of the earth's resources than ever before. Developing the best methods for analyzing them and monitoring change is a key role for landscape ecologists to play in ensuring that information can be understood and used to improve the sustainability of those resources into the future."

Accelerating global change has increased the complexity of managing and planning for resilient, sustainable landscapes. It is critical to leverage evolving techniques and technologies to understand the patterns of natural and built environments and how they are related to ecological processes and human activities. The variety of perspectives presented in this special issue demonstrates a wide range of research efforts by landscape ecologists to meet this challenge.