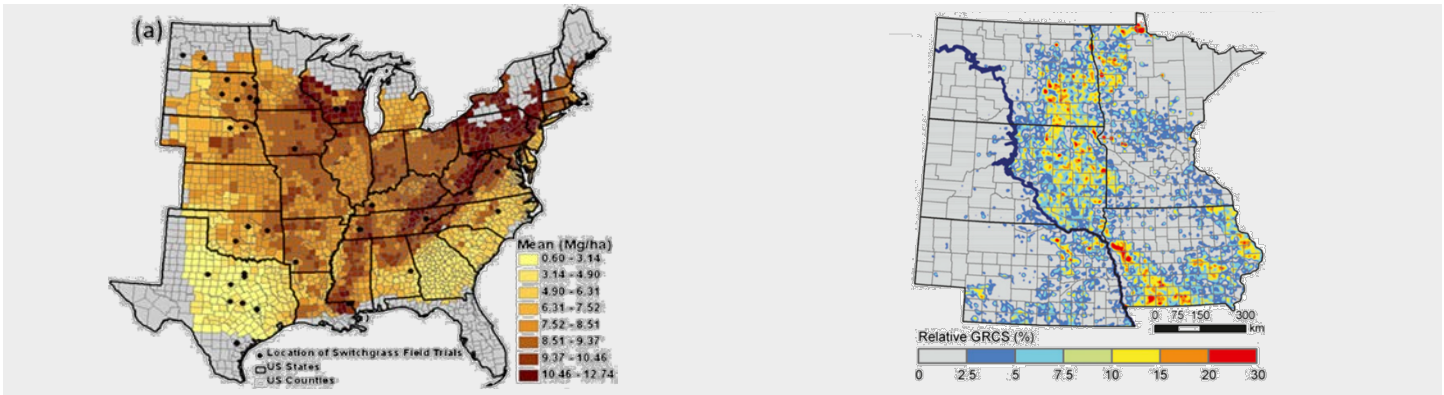
Regional Feedstock Partnership Highlights—North Central Region Biomass Resource Assessment

Researchers in the North Central region studied geographic patterns and year-to-year variations of bioenergy feedstock availability. They focused on determining how climatic variation influences yield of several feedstock crops and how land cover and land use change constrains feedstock production. Their work produced novel insights into the regional patterns of feedstock production and provided a long-term perspective on the sustainability of feedstock productivity over time. The results have been used by the Feedstock Partnership to help guide development of potential feedstock productivity maps at a national level.

Climatic Determinants of Feedstock Productivity: Researchers found that yields of upland and lowland switchgrass cultivars were associated with distinctive climate niches. Based on this result, they developed spatial models to map switchgrass yields across the eastern United States (left figure below). Their research confirmed that yields of both switchgrass and crop residues were sensitive to interannual climatic variation, particularly precipitation, and they also created maps of yield variability that reflected underlying climatic patterns. For example, their projections of switchgrass yield under future climate scenarios suggested a potential for increased yield of lowland cultivars and decreased yield of upland cultivars in the North-Central Region.

Land Cover and Land Use Change: Shifts in the patterns of agricultural land use, such as the amount and patterns of annual cropland versus perennial grasslands, affect the availability of different feedstocks and also impact ecosystem services such as water quality and wildlife habitat. They used historical land cover maps from the USDA National Agricultural Statistical Service to assess changes between grasslands and corn or soybean agriculture from 2006 through 2011. They found a net loss of grassland at the western edge of the Corn Belt and also highlighted specific locations of pronounced land use change (right figure below). Based on these data, they estimated there was approximately 3.2 million acres of net conversion of grassland to corn/soybean in the western Corn Belt from 2006-2011.



Left: Mean predicted yield of upland switchgrass from 1970-2008 (Tulbure et al. 2012). Right: Relative rate of grassland conversion to corn or soybeans in the western Corn Belt from 2006-2011 (Wright and Wimberly 2013).

References:
Tulbure, M., M. C. Wimberly, A. Boe, and V. N. Owens. 2012. Climatic and genetic controls of yields of switchgrass, a model bioenergy species. *Agriculture, Ecosystems, and Environment* 146: 121-129.

Wright, C. K., and M. C. Wimberly. 2013. Recent land use change in the western Corn Belt threatens grasslands and wetlands. *Proceedings of the National Academy of Sciences of the United States of America* 110: 4134-4139.

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