USDA United States Department of Agriculture

Natural Resources Conservation Service

Soil and Plant Science Division

Soil Survey Region 10

MLRA Soil Survey Office, Onalaska, Wisconsin

Bluff Prairie Ecological Site Description Project

Purpose

There is an unglaciated, driftless, bedrock plateau area of high relief in southwest Wisconsin, southeast Minnesota, northeast Iowa, and northwest Illinois. The drier southwest-facing side slopes in this area harbor remnants of rare bluff prairie ecosystems. Major Land Resource Area (MLRA) Soil Scientist Michael England from the Onalaska, Wisconsin, Soil Survey Office conducted field investigations of these ecosystems in collaboration with the Minnesota and Wisconsin Departments of Natural Resources, The Prairie Enthusiasts, Mississippi River Valley Conservancy, and local and State NRCS field offices. The investigations examined vegetation and soils on remote bluffs of the driftless area to produce bluff prairie Ecological Site Descriptions (ESD) across Iowa, Minnesota, and Wisconsin. The information in these ESD's will aid in managing the bluff prairie areas and preserving this unique collection of plant and animal species from extinction.

Background Information

The bluff prairie areas are important to specific wildlife communities, including birds, butterflies, invertebrates, and reptiles. The immediate threat to these areas is a lack of fire, which occurred historically and is needed to stop forest encroachment. Also, the invasion of more aggressive plant species is inundating the native species. The Bluff Prairie Ecological Site Description Project was initiated as a collaborative effort to restore specific plant and animal communities. Specific soil functions and properties support these unique and endangered ecosystems. The collaborators assisted in the research and shared historical documentation used to create the ESD's.

Mike England (MLRA soil scientist) at a Bluff Prairie Site on Mississippi River in Vernon County, WI, near Rush Creek, WI, State Natural Area.

Key Outcomes/Products

An important outcome from this project was a dichotomous key for a "State-and-Transition" vegetative model of the plant and animal communities. This model of soil and plant relationships describes specific practices and land management techniques for restoration of the prairie ecosystems that are important to many threatened and endangered plant and animals. It walks land managers through the required processes to reach their desired ecologic community.

The model is being used by the National Eagle Center in Wabasha, Minnesota, to predict additional winter hunting grounds for the endangered Golden Eagles. It also provides specific plant species, reference sites, and annual production (in pounds/acre) to measure richness and functionality of the current or desired prairie ecosystem. The management guide provides a list of invasive species and removal practices to ensure successful restoration efforts. The model is used by State, federal, and local governments for permitting prescribed burns and restoration efforts throughout the multistate area.

Peter Hartman (left-retired soil scientist, NRCS) and Kyle Steele (right-former regional ESD specialist, NRCS) at a Bluff Prairie rock outcrop that formed a cliff and cave in the sandstone bedrock.

Future Goals/Conclusions

The original soil survey areas that comprise the project area did not distinguish the very-steep, southwest facing prairie niches from the rest of the high-relief, forested landscape. The final step in this array of projects is a spatial update of the map units. The update will deliver the Bluff Prairie Ecologic Descriptions to specific components that are accurately placed within the landform. Digital soil mapping (DSM) techniques will be used to accurately identify and delineate areas associated with bluff prairie ecosystems, particularly in the counties that have not identified these map units. The digital soil map will be validated by field verification of the soil correlations and plant communities. The update will provide a seamless multistate spatial product. The soil update and linked Bluff Prairie Ecological Site Descriptions will enhance restoration efforts by the Minnesota and Wisconsin Departments of Natural Resources as well as those by The Prairie Enthusiasts.

Kyle Steele (left-former regional ESD specialist, NRCS) and John Zinn (retired State Grazing Specialist, NRCS-Minnesota) conducting plant clippings and data collection on species diversity in Wisconsin State Natural Area overlooking the Mississippi River.