

ECOLOGICAL SITES: A USEFUL TOOL FOR LAND MANAGEMENT

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Abstract.—Developing ecological sites in Missouri is a multiagency, multidiscipline effort led by the Missouri Department of Conservation and the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service. The methodology developed in Missouri has recently served as a model for ecological site development across the country and has aided in an initiative to accelerate the development of provisional ecological site descriptions nationwide in 5 years. Provisional ecological site concepts have been developed for the entire state; eight ecological sites have received additional field verification and review. Provisional ecological sites contain sufficient information for use in conservation planning and land management. Ecological site products include map services and reference documents that are available through federal Websites. Ecological site information is already being used by the Missouri Department of Conservation, the Natural Resources Conservation Service, and additional partners to develop inventories, identify key communities, and recommend management actions.

INTRODUCTION

Ecological classification is the process of dividing the landscape into repeatable, unique, and discrete units. Ecological sites are the basic components of a terrestrial classification system that describes ecological potential and ecosystem dynamics of land areas. An ecological site is defined as “a distinctive kind of land based on recurring soil, landform, geological, and climate characteristics that differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its ability to respond similarly to management actions and natural disturbances” (U.S. Natural Resources Conservation Service [NRCS] 2013). Examples of ecological sites in Missouri include loess upland prairies, low-base chert protected backslope woodlands, and loamy floodplain forests.

Ecological sites serve as a framework for linking soils and landscapes to natural communities and ultimately to natural resource management. The sites can help drive resource planning and management at a variety of scales, from ecoregion to landscape to the field and woodlot. Ecological sites are tied to the USDA's biogeographic divisions of major land resource areas (Fig. 1). In Missouri, the NRCS recently required that private landowners who have enrolled in certain federal cost-share programs, such as the Environmental Quality Incentives Program, the Conservation Stewardship Program, and the Conservation Reserve Program, use ecological sites. The process of developing ecological sites generates opportunities to improve our understanding of natural communities in Missouri and refine the statewide soil database by supplementing it with ecological data (in addition to soil surveys) where needed.

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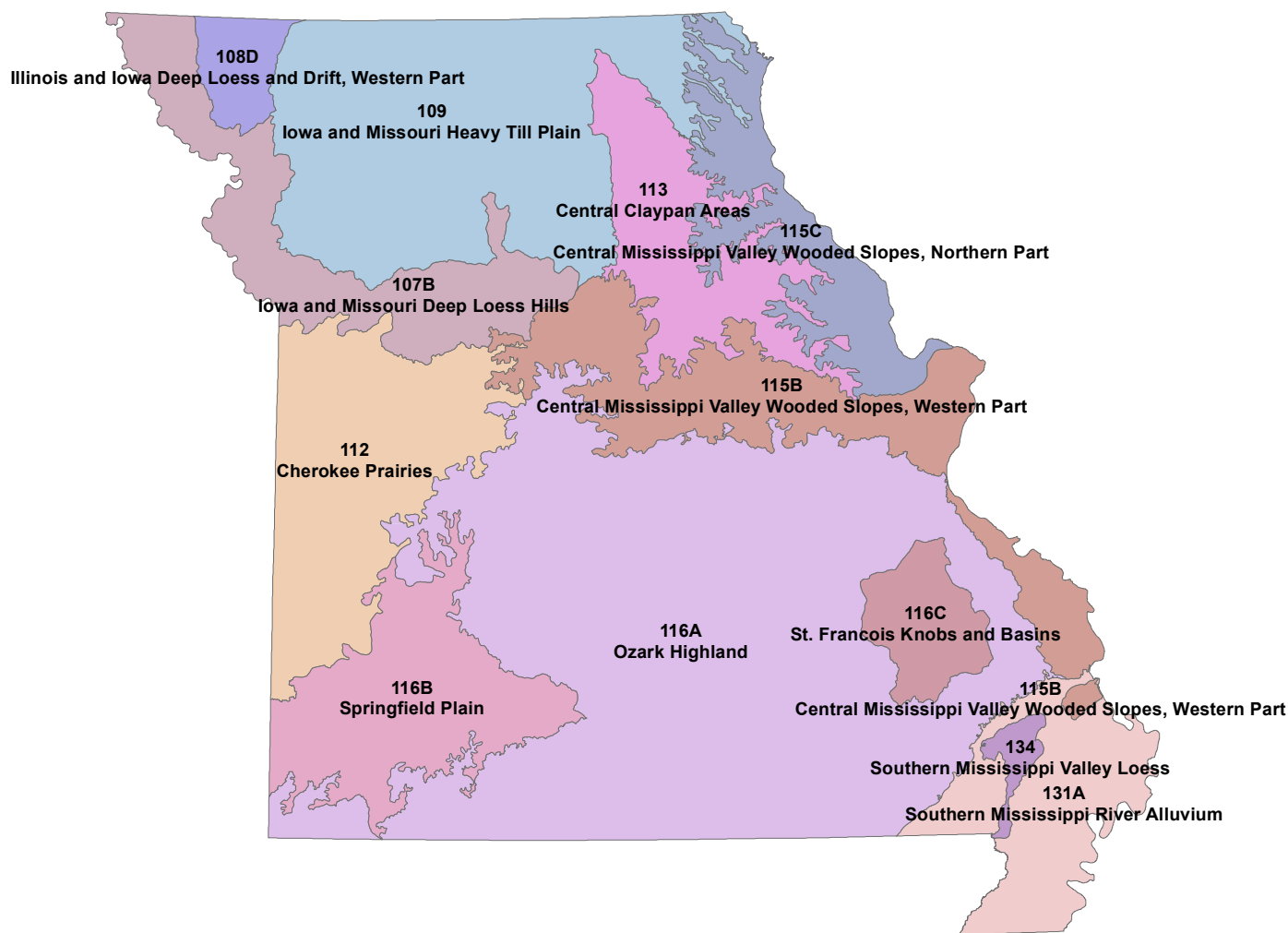


Figure 1.—U.S. Department of Agriculture biogeographic divisions of major land areas in Missouri.

METHODOLOGY

Ecological site development in Missouri is based on a framework of soil properties and select ecological factors. Statewide, eight essential soil and ecological factors have been identified that significantly influence vegetation and site productivity: landform, parent material, root restriction, base saturation, drainage, texture, flooding, and ponding. After delineation by physical properties, historical vegetation patterns or potential vegetation communities are correlated to each land unit, resulting in a provisional ecological site. Each ecological site receives a three-part name that includes soil or substrate plus landform plus vegetation community.

Every ecological site is field verified to strengthen and refine the concepts and to determine reference community locations. Field requirements for ecological site verification include a three-tiered data collection process, beginning with the most minimal requirement of field observations at the tier I level to the intermediate level tier II reconnaissance plot data to the ultimate requirement of highly detailed plot data collection. This comprehensive data collection results in species composition, canopy cover, biomass estimates, and ground cover information for the tier III level (NRCS 2014). The NRCS conducts several reviews that involve soil scientists and vegetation specialists on each ecological site before information is made available to the public. The first level of review results in a provisional ecological site and ultimately, tier III level data collection results in a correlated ecological site.

Provisional ecological site concepts have been developed for the entire state of Missouri; eight ecological sites have received additional field verification and review. With provisional ecological sites completed statewide, Missouri will be able to make more detailed data products available in a relatively short time frame. The methodology for ecological site development created in Missouri through the partnership of the Missouri Department of Conservation (MDC) and the NRCS has been used as an example to inform national ecological site development and promote the development of provisional ecological sites nationwide in 5 years.

PRODUCTS

With provisional ecological sites completed statewide (Fig. 2), a number of products are now available for land management, including the reference documents known as ecological site descriptions (ESDs). ESDs function as the primary repository of ecological knowledge about a given ecological site (Fig. 3). Although still in the provisional development stage, the Missouri ESDs contain sufficient information for use in conservation planning and land management, including the following sections: ecological site extent maps, physiographic features, landscape block diagrams, soil feature descriptions, ecological dynamics with state and transitional models, plant lists, site interpretations for wildlife and forestry, and references and definitions. The MDC, the Missouri office of NRCS, and additional partners are already using the ecological site data. Ecological site information can be used to develop inventories, identify key communities, and recommend management planning. For example, knowledge of an ecological site can guide restoration efforts by supplying species lists and associated canopy cover, basal area estimates, and information about historical disturbance regimes for community management.



Figure 2.—The provisional ecological sites of Missouri, showing all dominant soil map units correlated to ecological site.

Ecological Site Description

Till Protected Backslope Forest

Major Land Resource Area 109

Iowa and Missouri Heavy Till Plain

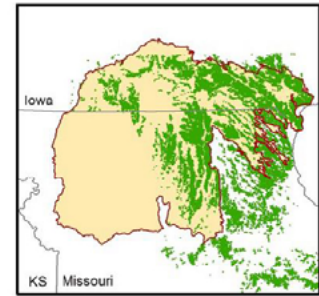


Figure 3.—Example of an approved ecological site description (ESD) cover page. The ESD is the written reference document associated with each ecological site and acts as repository of all knowledge associated with that ESD.

Ecological site descriptions are maintained on the NRCS Ecological Site Information System Website (<https://esis.sc.egov.usda.gov/>), which is the national repository for information associated with ESDs and the collection of all site data. For Missouri, an additional Website location for provisional ESDs is the Missouri Field Office Technical Guide (NRCS, n.d. a), with ecological site information available in Section II of the Website (heading: Soil and site information). Ecological site information, including maps, is also available via the NRCS web soil survey (NRCS, n.d. b) using tabs marked “Soil Data Explorer” and “Ecological Site Assessment” options which can be accessed by creating an “Area of Interest” (AOI) after selecting “Start WSS”.

SUMMARY

Ecological site development in Missouri is a multiagency team effort. The team creates products designed to drive resource planning and management at a variety of scales, from ecoregion to landscape to the field and woodlot. Ecological sites will allow us to understand how ecosystem attributes vary within and among regions and can be influential in developing sound management goals and objectives. Multiple disciplines such as silviculture, wildlife management, grassland planning, natural community management, ecosystem restoration, private lands conservation, and scientific research can all benefit from using ecological site information. The Missouri ecological site project now has ecological sites statewide, and numerous products are available for land managers.

ACKNOWLEDGMENTS

Funding for this project was provided by a cooperative agreement between the Missouri Department of Conservation and the U.S. Department of Agriculture, Natural Resources Conservation Service (CECS NRCS Agreement #69-6424-11-141) with cooperation from Southern Illinois University – Carbondale (SIU-C) (CA #72). Additional field and technical support was provided by Tim Nigh, retired MDC ecologist; Dennis Meinert, soil scientist, Missouri Department of Natural Resources; Grant Butler, soil scientist, NRCS; Stribling Stuber, plant ecologist, Jones Ecological Research Center; and Garrett McKee, Erin Skornia, and Alex Ebert, plant ecologists, MDC/SIU-C.

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