



LONG TERM ECOLOGICAL MONITORING IN PRAIRIE PARKS

**Northern Prairie Wildlife Research Center
Missouri Field Station, Columbia, Missouri
Arkansas Field Station, Fayetteville, Arkansas**



The Northern Prairie Wildlife Research Center Missouri Field Station is located in the Department of Soil and Atmospheric Sciences on the University of Missouri-Columbia campus; the Arkansas Field Station is located in the Department of Biological Sciences on the University of Arkansas campus. A primary focus of these two field stations is developing ecological monitoring protocols for small National Parks that contain native and restored prairies. The purpose of this document is to describe and summarize various monitoring protocols under development by or coordinated by the Missouri and Arkansas Field Stations.

PROGRAM OVERVIEW

In 1992, the National Park Service (NPS) began developing prototype inventory and monitoring programs within each of ten biogeographic associations. The prototype programs design, test, and implement long-term ecological monitoring protocols to support park planning and management. The ecological monitoring protocols are meant to be applicable to other NPS sites and to public and private reserves within the biogeographic area. The Missouri and Arkansas Field Stations, in cooperation with the National Park Service Prairie Cluster Long-Term Ecological Monitoring (LTEM) Program, develop and test various ecological monitoring protocols for six small, midcontinent national parks. These parks contain high quality to degraded prairie and savanna remnants including: short to mixed-grass prairie (Scotts Bluff National Monument, Nebraska and Agate Fossil Beds National Monument, Nebraska);

tallgrass prairie (Homestead National Monument, Nebraska and Pipestone National Monument, Minnesota); and savanna (Effigy Mounds National Monument, Iowa and Wilson's Creek National Battlefield, Missouri).

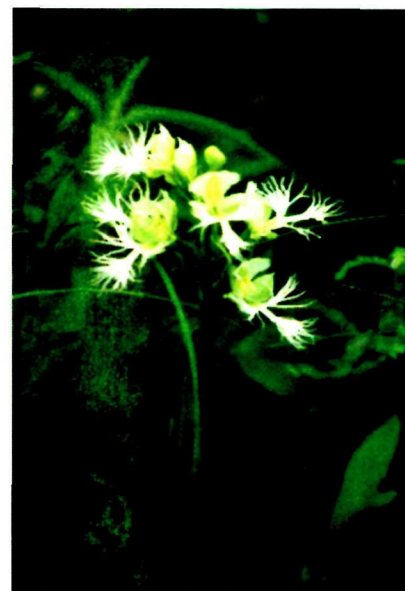
RESEARCH FOCUS

Ecological monitoring protocols under development are intended to help determine the degree to which the species, communities, and processes under park stewardship are sustainable. The protocols relate to three high priority management issues: 1) sustainability of small remnant and restored prairie communities, 2) external landuse and watershed impacts to small prairie preserves, and 3) impacts of fragmentation on the biological diversity of small prairie parks. The program has established partnerships with academic institutions, other agencies, and private groups to ensure scientific credibility and long-term consistency within the monitoring program. Monitoring results will be distributed

to a wide range of audiences, including all prairie parks in the Great Plains.

CURRENT STUDIES

Vegetation community monitoring in the Prairie Cluster parks.
Principal investigators: Sean Jenkins



and Keith Grabner, University of Missouri. Much of the current resource management effort in the Prairie Cluster LTEM parks is directed toward restoring and maintaining grassland communities. Vegetation monitoring protocol development focuses on detecting changes through time in community composition, structure, and diversity of native remnant communities. In areas undergoing restoration, vegetation monitoring protocol development measures progress toward model community composition and structure.

Monitoring protocol development and testing for the endangered Missouri Bladderpod. Principal investigators: Michael Kelrick, Truman State University; Lisa Thomas, Wilson's Creek National Battlefield. *Also: Monitoring protocol development and testing for the threatened western prairie fringed orchid.* Principal investigator: Gary Willson, Missouri Field Station. These two studies focus on two federally listed species that occur within the Prairie Cluster: Missouri bladderpod at Wilson's Creek National Battlefield, and the western prairie fringed orchid at Pipestone National Monument. These monitoring protocols expand on existing monitoring efforts begun for Missouri bladderpod in 1988, and for the western prairie fringed orchid in 1993. In addition to estimating population size, the spatial distribution of the populations will be mapped, and demographic parameters will be estimated.

Effects of size, fragmentation, and management of prairie remnants on biodiversity and sustainability. Principal investigators: Jack Cully, USGS Kansas State Cooperative Fish and Wildlife Research Unit; and Diane Debinski, Iowa State University. A survey of existing research for the Prairie Cluster LTEM parks revealed that little information

was available on the terrestrial invertebrates. Butterflies may be particularly good indicators of prairie health because they include both generalist and endemic prairie species, interact with prairie vegetation as both herbivores and pollinators, and occur at a scale appropriate to small parks. This project is developing butterfly inventories for the six prairie parks.

Inventory and monitoring of the black-tailed prairie dog in the National Park Service. Principal investigator: Glenn Plumb, Badlands National Park. Approximately 98% of the historic range of the three major species of prairie dog has been eliminated by disease, agriculture practices, and urban development since the early 1900's. The black-tailed prairie dog occurs in 8 parks in the Great Plains with colonies ranging from large and dispersed at Badlands NP to small and geographically isolated at Scotts Bluff, NM. Prairie dog monitoring will refine and describe black-tailed prairie dog sampling protocols with common applicability in all NPS units. A draft protocol is written and in review.

Development and validation of biocriteria for National Parks in the prairie ecoregion. Principal investigator: Charles Rabeni, USGS Missouri Cooperative Research Unit. *Small prairie streams* flow through four of six cluster parks. Agricultural and urban pollution from outside park boundaries further degrade stream quality. This protocol uses benthic macroinvertebrates as indicators of overall stream health.

Macroinvertebrate monitoring in the prairie parks began in 1988; a draft protocol is written and in review.

Climate monitoring in relation to rare plant population dynamics. Principal investigator: Adnan Akyüz, University of Missouri. Weather and climate affect biological components of grassland systems including production, species

composition, and diversity. Continuous weather monitoring is a key factor in isolating the effects of management actions on vegetation dynamics in prairie parks and on evaluating population fluctuations of rare species. The Missouri Assistant State Climatologist is developing weather monitoring protocols, installing and maintaining equipment, and archiving data.

Inventory and monitoring protocol development and testing for grassland birds. Principal investigator: Abby Powell, USGS Northern Prairie Wildlife Research Center Arkansas Field Station. Grassland birds are among the most rapidly declining bird species. Small prairie parks need information regarding the current populations of grassland birds and guidance on how to monitor their populations. This project will produce baseline inventories for grassland birds in the prairie parks and develop monitoring protocols for grassland bird communities.

PARTNERS

USGS Arkansas Cooperative Fish and Wildlife Research Unit

USGS Kansas Cooperative Fish and Wildlife Research Unit

USGS Missouri Cooperative Fish and Wildlife Research Unit

Agate Fossil Beds National Monument

Badlands National Park

Effigy Mounds National Monument

Homestead National Monument

Pipestone National Monument

Scotts Bluff National Monument

Wilson's Creek National Battlefield

Nebraska Game and Parks
Commission

University of Arkansas

University of Missouri-Columbia

The Nature Conservancy

FOR FURTHER INFORMATION:

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