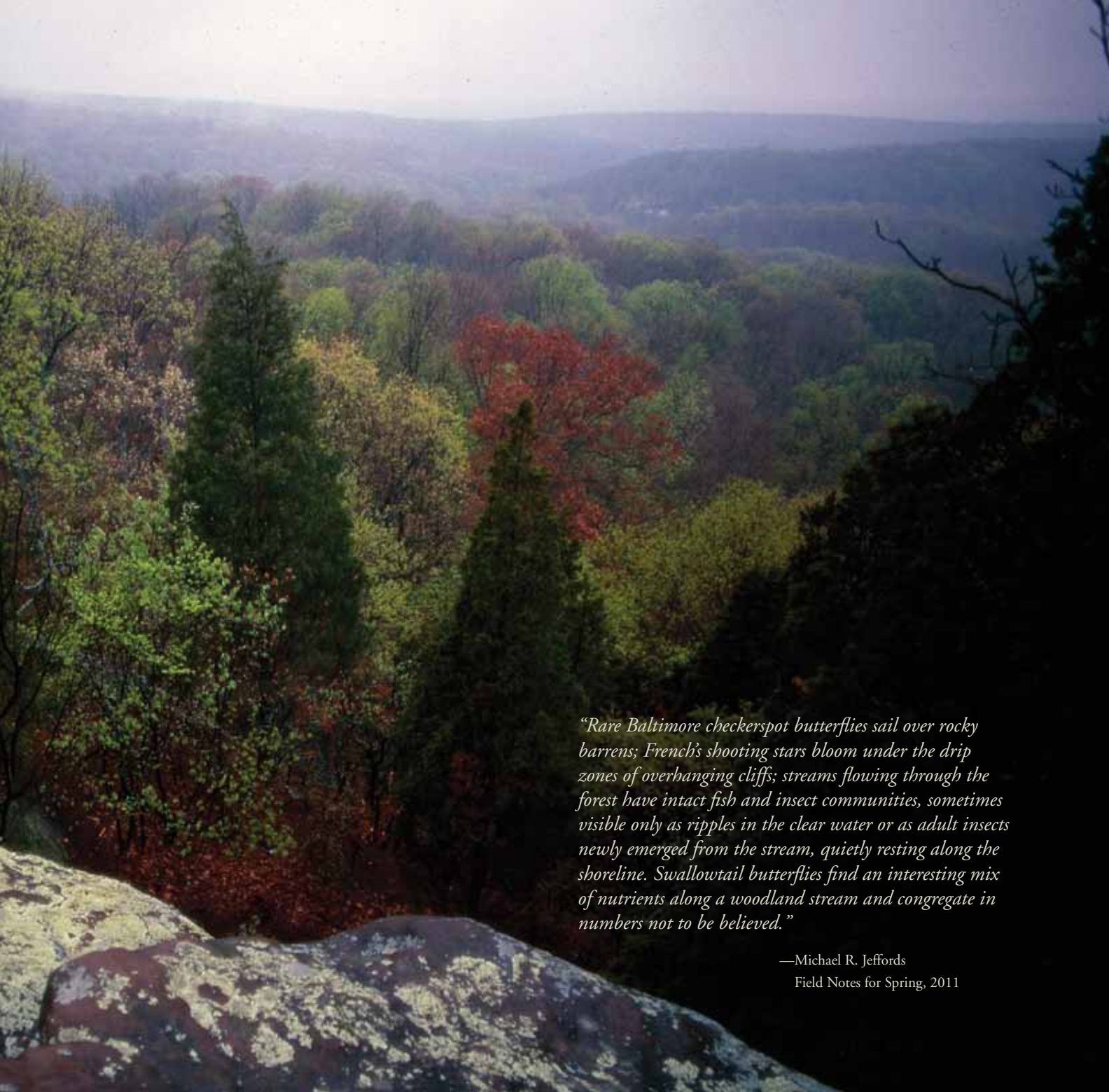
Natural Areas of the Shawnee National Forest



"Rare Baltimore checkerspot butterflies sail over rocky barrens; French's shooting stars bloom under the drip zones of overhanging cliffs; streams flowing through the forest have intact fish and insect communities, sometimes visible only as ripples in the clear water or as adult insects newly emerged from the stream, quietly resting along the shoreline. Swallowtail butterflies find an interesting mix of nutrients along a woodland stream and congregate in numbers not to be believed."

—Michael R. Jeffords
Field Notes for Spring, 2011

dry upland forest

If a single word could define the Shawnee National Forest, *diversity* would be most appropriate. The Shawnee occupies an area of Illinois just south of where the Illinoian Glacier stopped during the Pleistocene Epoch (~120,000 years ago). Here massive sandstone, limestone, and shale escarpments stand ancient, weathered, and exposed. Today, a mantle of trees covers most of the landscape. Glades, where the rock is at or near the surface, are open areas in the forest; rock ledges are windswept, inhospitable places where trees grow only around the edges and in the ever-widening cracks and faults in the rock. The deep, steep-sided ravines are verdant jungles of American beech, maple, and a host of other tree species. The overarching factor, though, is the forest, primarily dominated by oak and hickory, but supporting great tree diversity as the moisture and landforms vary.

Even though the majority of the original forest has been logged from 1–10 times, as noted in a 1931 report of William L. Barker, and much of it farmed for over 100 years, with the advent of its designation of a National Forest in 1933, the Shawnee began it's long recovery. Today, the forest is dramatic, dynamic, and beautiful.

Natural Areas are special places in the Shawnee that still reflect the habitat, plant, and animal diversity present before European settlement. A natural area is defined as "an area of land or water in public or private ownership which either retains or has recovered to a substantial degree its original natural character, though it need not be completely undisturbed, or has floral, faunal, or ecological features of state significance." Notwithstanding the bureaucratic jargon, individuals know when they have entered a special place in the forest. A further designation in the Shawnee is called a Research Natural Area—permanently protected to maintain biological diversity and to provide places for research and monitoring of undisturbed natural areas. With evocative names like LaRue-Pine Hills/Otter Pond and Panther Hollow, they are locations worth a visit.

Scientists have divided the terrestrial part of the earth into large ecological regions called biomes. Examples of worldwide biomes include tropical rainforest, Asian steppes, African savanna, and a host of others. The North American continent also has biomes, such as the Arctic tundra, Sonoran desert, and Appalachian forest. Illinois, too, has had its landscape divided, not into biomes, but into regions called Natural Divisions. The natural divisions of Illinois were presented in 1973 in a technical report authored by then state botanist John Schwegman and colleagues. They proposed that Illinois be divided into 14 Natural Divisions based on such characteristics as glacial history, soil type, topography, climate, and the distribution of native plants and animals. These 14 divisions were further subdivided into 33 subdivisions. Over the years, Illinois' natural divisions have proven very useful to the natural area preservation movement within the state. They help biologists categorize and prioritize Illinois' 90+ natural habitats for preservation and restoration efforts. The Shawnee Hills Natural Division encompasses a good portion of southern Illinois, including all of the Shawnee National Forest.

Satellite image of southern Illinois
showing much of the Shawnee National Forest area.

Left, old growth forest

Importance of Natural Areas

Other than for their beauty and academic interest, why are natural areas important?

- Natural areas are the genetic banks for the area's biodiversity. They are both reservoirs for the species that should be present and also the templates or reference points we must use for our habitat restoration efforts.

- Natural areas cannot be separated from the organisms that depend on them for survival.

- Natural areas in Illinois are our biological heritage, equally as important as our rich collection of cultural, historic sites.

If one were to pick a single area of Illinois to experience nature at its finest, the Shawnee National Forest would be an excellent place to begin.

How Do We Know About the Natural Areas of Illinois? —The First Natural Areas Inventory and the Update

Illinois' natural areas were once familiar only to biologists, certain landowners who recognized how different that small patch of woods or prairie was on their land, and a handful of natural resource professionals. These sites were reminiscent of conditions in Illinois before European settlement and ranged in size from several thousand acres of wetlands along the Cache River in southern Illinois to tiny prairie patches existing along rail lines or in pioneer cemeteries scattered throughout the state. To determine how much of Illinois' natural lands remained, a statewide Natural Areas Inventory was conducted from 1975 to 1978. It documented nearly 1,200 sites across Illinois that were biologically significant. This inventory was a remarkable accomplishment and a unique undertaking for an area of the size and complexity of Illinois. Over the last few decades, the inventory has been an important tool in the conservation of Illinois' vanishing, rare habitats and the plant and animals they harbor.

On July 1, 2007, a new project to update the Illinois Natural Areas Inventory (INAI) began. Its mission was to develop a contemporary list of natural areas of biological significance, based on current Illinois landscapes using the best available scientific techniques. The INAI Update systematically screened the entire state to find, evaluate, classify, and map additional natural areas. Even though Twenty-first Century technology—remote sensing, Geographic Information Systems, and digital imaging—is a prominent component for the update, it is important to note that all sites were visited by scientists. On-the-ground experts assessing and making the final judgments on the overall quality of a natural community remain the most important step in the process.

Far left, eastern tailed blue; left, a dry Shawnee forest; left inset photos, clockwise from upper left, White-breasted Nuthatch, Wood Thrush, gray treefrog, French's shooting star, elephant stag beetle, milk snake, Azalea in bud, gray squirrel; above, barrens; right, sharp-lobed hepatica *Hepatica acutiloba*.

Natural Areas In the Shawnee National Forest

The Shawnee is significant to the Inventory for a number of reasons:

- the Shawnee is the second largest owner of natural areas listed on the Inventory, encompassing a wide diversity of sites;
- it harbors a considerable percentage of Illinois' rarest biological resources. Almost 10% of all the Illinois Natural Areas Inventory sites are located in the Shawnee;
- in nearly a dozen cases, the Shawnee supports the only known examples of natural community types in Illinois, and these sites are irreplaceable.


moist upland forest


oak-hickory forest–spring


Dutchman's Breeches

Understanding Natural Communities in the Shawnee National Forest

Perhaps the best way to understand the natural areas of the Shawnee is with a list, a brief description, and images of the broad habitat types that are present.

Upland Forest

Forests are certainly the most widespread and diverse natural communities in the Shawnee, and upland forests dominate. Upland forests are, simply, those that do not flood. Several distinct types occur, however, based on the amount of moisture available and quality of the soil. A gradient from extremely dry (xeric) to moist sites occurs within the forest. Although all sites are mostly characterized by oaks, the species composition varies considerably. Post, blackjack and scarlet oaks dominate the driest sites; the somewhat moister sites include post, blackjack, black and white oaks, and various hickories. Further down the moisture slope, we find the typical "oak-hickory" forests dominated by black, white, northern red oak, and various hickories—shagbark and pignut. This is the most widespread forest type in the region. On the moister sites, tree diversity increases and the trees grow straight and tall with few lower branches and a well-developed understory. Tree species here include American beech, sugar maple, northern red oak, tulip pop-


Indian Pink


oaks in winter

luna moth

moist upland forest

lar, river birch, and sycamore. The understory and herbaceous layers also vary across these forest types with the greatest diversity found on the moister sites.

Bottomland Forest

Bottomland forests occur along streams that are subject to periodic flooding and form distinct communities. Tree diversity is much lower as only species that are adapted to flooding persist here.

Moist floodplain forests occur along major streams in the Shawnee. On land that has more rugged topography and steeper-sided valleys, the flood episodes are short and infrequent. Dominant trees are white oak, sugar maple, and American beech, but also include black walnut, white ash, bur oak, and pecan. The real distinction in this forest type, however, occurs in the understory species: lizard's tail and cardinal flower are two prominent examples. On the wettest sites, the canopy trees grow well, but are generally shorter than on better-drained sites. Common species are sweetgum, honeylocust, black walnut, and silver maple. The shrub layer is sparse, but the herbaceous layer can be quite thick and includes poison ivy, giant cane, various sedges, and greenbriar.

Woodlands

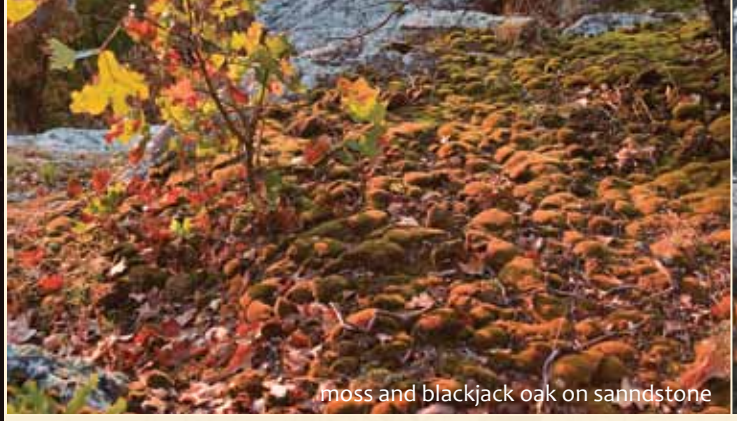
Distinguishing woodlands from forests may seem like "splitting hairs," but the distinction is quite real. Woodland is a dry community dominated by trees, grasses, and forbs. The tree height seldom exceeds 50 feet and the trees, even though they are the same species found in for-

larkspur

bottomland forest

Red-bellied Woodpecker


celandine poppy


moss and blackjack oak on sanndstone


wo

ests, have a very different growth form. Woodland trees have a highly branched trunk with spreading limbs. Some call them "wolf trees." The most prominent species are post and blackjack oak and black hickory. The canopy is very open, the shrub layer is sparse and dominated by farkleberry, while the herbaceous layer contains woodland sunflower, little bluestem, and various asters. Fire is extremely important in maintaining this community type.

Barrens

While the term "barrens" may provide a distinct impression that might deter a visitor into thinking the site is not worth visiting, nothing could be further from the truth. Barrens are unique communities, rich in life and complex in structure. Barrens owe their existence to a delicate balance of natural forces that prevent them from becoming a typical forest community. Unlike forests, where trees dominate, in a barrens community the herbaceous layer is equally as important as the trees. The landscape has many vines, lichens, and mosses scattered about in patches of open ground, and surface rocks contribute to the unstable, often poor soil conditions. Barrens may be located on sandstone, limestone, or shale. The plant communities, however, remain very diverse with white, post, and blackjack oaks common (although all are scattered, stunted, and limby). The herb layer has farkleberry, little bluestem, Venus' looking glass, purple milkweed, Indian pink, New Jersey tea, and a host of other species. Animals include Baltimore checkerspot


barrens


shaggy mane mushrooms


moist upland forest


oodland fire for management


long-tailed salamander


American featherfoil

butterflies and eastern hognose snakes. Fire is a critical management tool to restore and manage these communities.

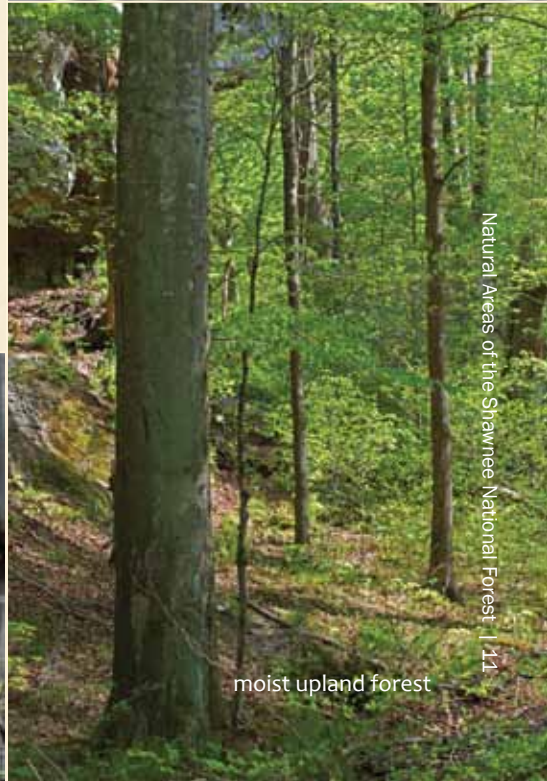
Swamp

Swamps are rare communities, as might be expected in an area of rolling to rugged topography that characterizes the Shawnee. In fact, they only occur in the LaRue-Pine Hills Research Natural Area. Two types of swamps are found here: typical freshwater, woody communities dominated by trees with surface water for most or all of the year, and shrub swamps, where trees are less evident. Typical tree species for both types include bald cypress, water tupelo, pumpkin ash, and Drummond's red maple. Typical shrub species are Virginia sweetspire, swamp rose, and buttonbush. Uncommon herbs include American featherfoil, copper iris, and kidneyleaf mud plantain.

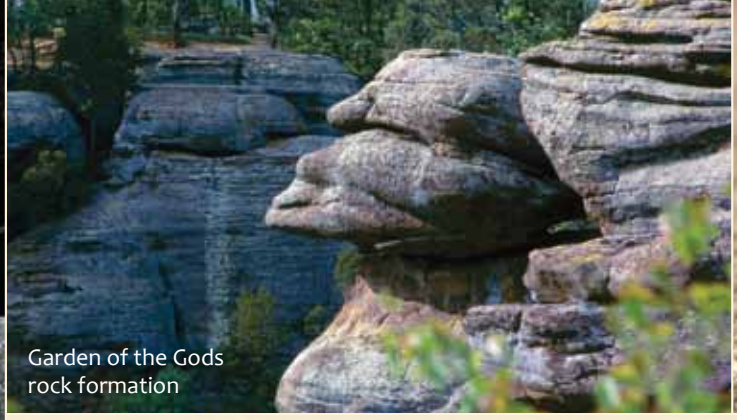
Seep

While wetlands are relatively uncommon in the Shawnee, seeps and springs do occur in the bottomlands of the Ohio, Mississippi, and Cache rivers and scattered along tributary streams that traverse the forest. Springs are limited to the LaRue-Pine Hills area, but acid seeps are scattered through the Cretaceous Hills. These seeps support sphagnum moss and are acidic in nature, obtained from the Cretaceous gravels the water flows through. These unique habitats are found along small stream floodplains or flow from the slopes of the rolling landscape. Interesting organisms found here include cinnamon fern, royal fern, cardinal flower, cranefly orchid,


swamp with water tupelo and bald cypress


moist upland forest


natural rock arch


Garden of the Gods rock formation


tiger beetles

phantom cranefly, red-banded hairstreak butterfly, and the uncommon gray petaltail dragonfly.

Cliff

Vertical rock faces in the Shawnee are certainly common and share the following characteristic: they have virtually no soil, although sand can be found on ledges and along the bases. They do diverge, however, when we consider the type of rock—sandstone or limestone—and the degree of wetness they exhibit. The moisture gradient is determined by the aspect (direction in which they face) and the types of surrounding natural communities. The plant communities are relatively uniform across the Shawnee, with the north- and east-facing cliffs somewhat more lush than south- and west-facing cliffs. Typical plants of dry sandstone sites include alumroots, spleenworts, and lichens. The moister sites have walking fern, clubmosses, wild hydrangea, and partridgeberry. Limestone cliffs along the Mississippi and Ohio rivers have a somewhat more diverse flora. Frequent species include red columbine, cleft phlox, and various ferns. Where the cliff faces are hollowed out, ledges overhang the land below to create sheltered microclimates that are moister and darker. Here we find French's shooting star and large colonies of antlion larvae with their characteristic pits.

Glades

Glades differ from barrens by having more exposed bedrock and a variety of mosses and lichens. They may be either


wolf trees


fern-covered cliff face

pale purple coneflowers

sandstone overhang
with small cave entrance

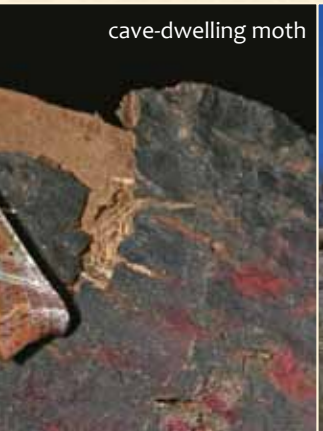
sandstone or limestone. In areas of high visitation, the glades are often trampled and little but bare rock remains. Prickly pear cactus is commonly found, as is sedum. Limestone glades can be quite spectacular with displays of eastern purple coneflower, wild hyacinth, and New Jersey tea. Eastern red cedar and blackjack oak may dominate and interesting animals include the lichen grasshopper, the rock-loving crane fly, and olive hairstreak butterfly.

Cave

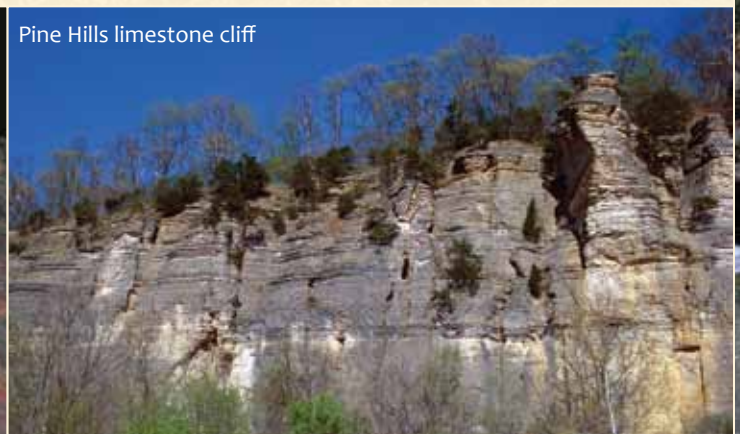
Cave communities have two common features—a total absence of light and no green plants. They may be wet or dry, and most have an intact fauna adapted for living in this unique environment. Most are found in limestone in the Shawnee.

The typical animals found in dry caves include cave crickets and various species of bats. Wet or aquatic caves have pools, streams, and waterfalls. Typical inhabitants include spring cavefish and various invertebrates (most colorless) adapted for the cave habitat.

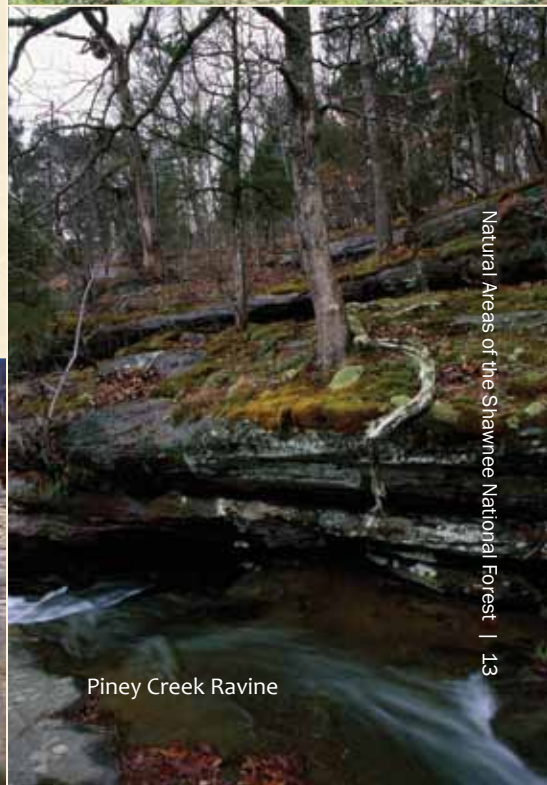
Baltimore checkerspot



cave-dwelling moth



Pine Hills limestone cliff



Piney Creek Ravine

sandstone ledge

The Shawnee—A Haven for Threatened and Endangered Species

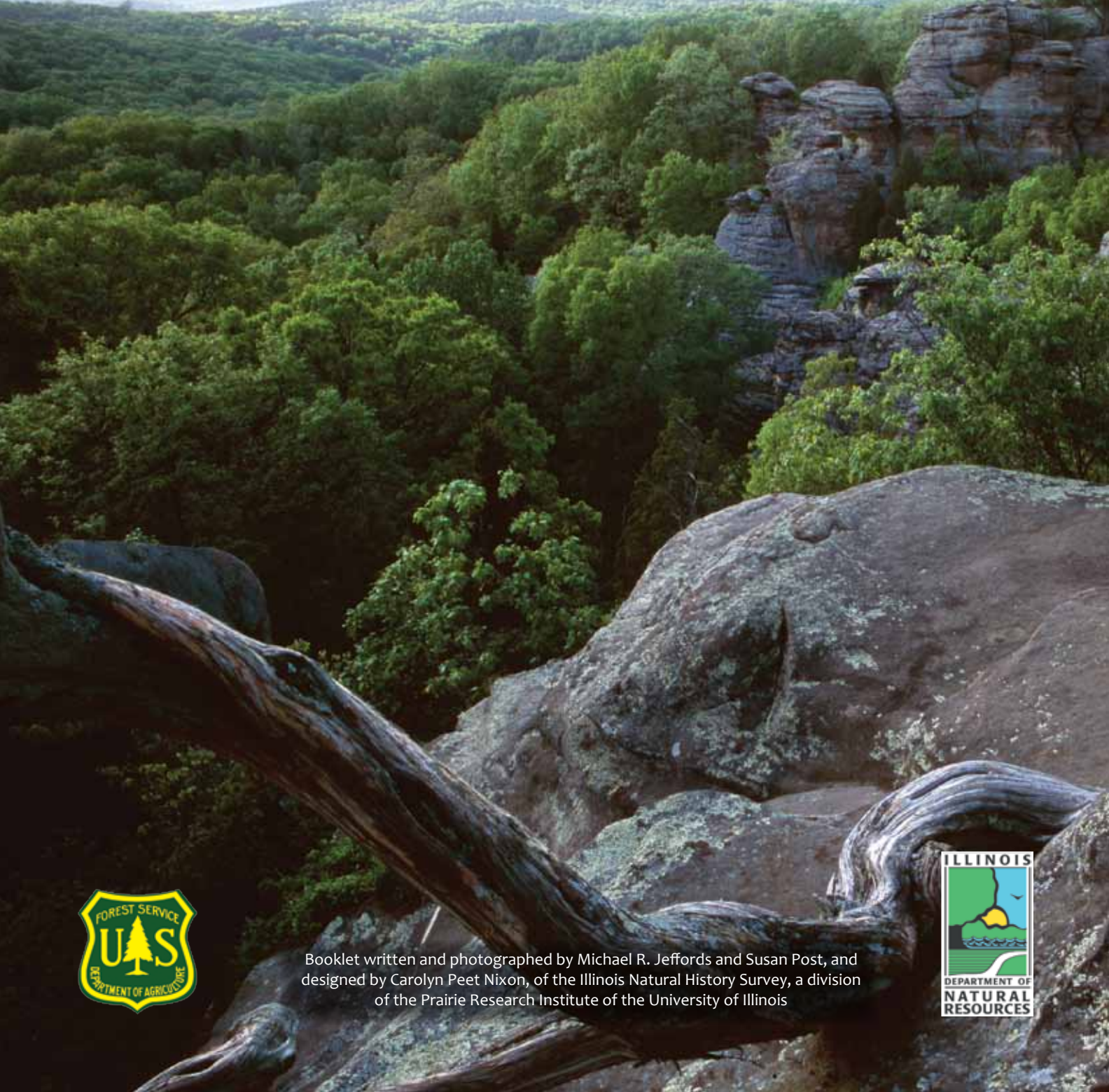
The Shawnee National Forest is one of the largest contiguous blocks of public land in Illinois, and due to the diversity of its habitats and landforms, it comes as no surprise that a large number of the state's threatened and endangered species live here. We currently know of nearly 400 plants and animals that fall either in the state's threatened (a species that is likely to become endangered in the near future) or endangered (a species in danger of extinction) categories. In addition, federally listed species, such as Mead's milkweed, occur in the Shawnee.

These plant and animal species whose populations are declining or that have become so rare as to put their continued survival at risk deserve special attention. These species are important members of our biological heritage and must be preserved. As E.O. Wilson so eloquently stated, "They are a magic well of eons old information." We must remember that extinction is forever and is irreversible when it occurs.

Upper left, Black-crowned Night-Heron, (state endangered); center left, eastern ribbon snake *Thamnophis sauritus* (state threatened); bottom left, kidney leaf mud plantain *Heteranthera reniformis* (state endangered).

Protection and Stewardship

While the Shawnee National Forest is public land and is protected from development in many ways, its natural areas, and the forest itself, needs more than just protection. Over eons, the forest and its various habitats have developed in response to environmental factors such as weather patterns, fire, and grazing. During the last two centuries, though, relatively large numbers of humans, mostly of European origin, have moved into and across the Shawnee, often altering the landscape and its environmental patterns to fit their own needs. Fire patterns within the forest were drastically altered (often eliminated), the land was cleared for agriculture, while dozens of exotic, often invasive species were introduced and spread across the land. While all three factors can forever change an ecosystem, active management by forest service and state personnel can ameliorate these changes and return portions of the landscape to pre-European settlement conditions. Such active management and restoration activities as restoring normal fire regimes and removing exotic, invasive species (e.g., kudzu, honeysuckle) are far better alternatives than to either lose these habitats forever or to try to recreate them. The Shawnee, its stakeholders, and the state of Illinois must work cooperatively to form a resilient network of natural areas for research and for the sheer enjoyment of this resource that we call the Shawnee National Forest.



Booklet written and photographed by Michael R. Jeffords and Susan Post, and designed by Carolyn Peet Nixon, of the Illinois Natural History Survey, a division of the Prairie Research Institute of the University of Illinois