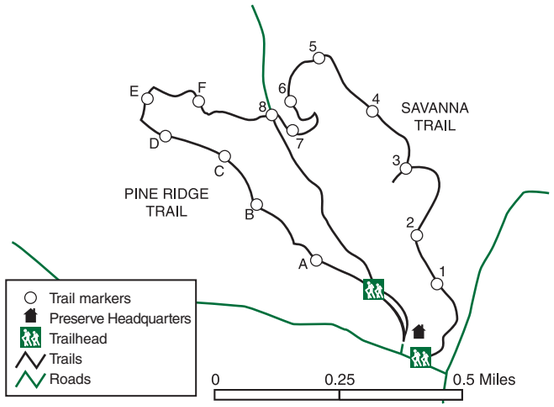
Nickel Preserve
SELF-GUIDED TRAILS



For further information about
The Nickel Preserve and The Nature Conservancy
please contact the
Preserve Manager at (918) 456-7601 or
Visit or website at www.nature.org/oklahoma

The Nature Conservancy

Protecting nature. Preserving life.™

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KIRKPATRICK FOUNDATION, INC.

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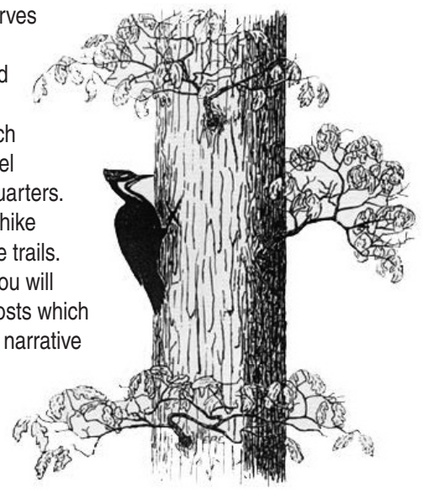


This brochure serves as a guide to the Savanna Trail and the Pine Ridge Trail, both of which begin at the Nickel Preserve Headquarters. You may wish to hike one or both of the trails. Along the trails you will find numbered posts which coincide with the narrative in this brochure. These are good places to stop and observe the plants and animals around you.

Please observe
the following rules and recommendations when hiking trails:

1. Be Prepared. Bring water, apply insect repellent and sunscreen as needed. Know your abilities, and do not overexert.

2. Do not pick flowers. Leave the trail as you found it. Do not take plant or animal parts, rocks, or any other items.

3. Do not wander away from trail. Tall grasses and brush may conceal hazards such as snakes, biting or stinging insects, ticks, poison ivy, rocks and holes.

Savanna Trail

1. Ozark Geology

The Ozarks consist of a dome that has been slowly uplifted and eroded, resulting in a pattern of rolling plains to highly dissected hills with deeply entrenched valleys. Its unique geological history has led to a diverse landscape comprised of a great variety of plant communities. A major reason for the region's high biological diversity is that parts of the Ozarks have been continuously available for plant and animal life since the late Paleozoic, some 230 million years ago, and constitute perhaps the oldest continuously exposed land mass in North America.

Soils throughout the preserve are very thin, with a layer of chert gravel several feet thick that overlies a layer of limestone. The dissolution of this limestone layer has formed several caves throughout the preserve. Alternating beds of shale and sandstone occur beneath these layers. The Burgen Sandstone that occurs at the surface along the Illinois River dates to over 450 million years old. The rugged topography has spared much of the area from conversion to agriculture and other development.

2. Fire

Fire is believed to have been a frequent and widespread ecological process that profoundly shaped the natural communities of the Ozarks. Prior to the settlement of Indian tribes in the mid-1800s and subsequent settlement following the Land Run and statehood, the region had a history of frequent fire. In addition to lightning-set fires that most often burned in the spring and summer, native Americans are known to have set fires each autumn. Fires were set to improve forage for wildlife, to drive herds, increase visibility, increase plant diversity for foods & medicines, and many other uses.

Historical evidence suggests that Ozark landscapes have changed dramatically in the absence of periodic fire. Early descriptions of the region consistently noted open prairies, grass-covered savannas, and very open woodlands with abundant herbaceous ground cover. The frequency, seasonality, and intensity of fires would likely have varied widely for any given site. This would have led to a diverse landscape comprised of a mosaic of vegetation types including prairie, shrubland, savanna, woodland, and forest.

This part of the preserve has a recent history of intense fires that followed an herbicide application. The grasses and forbs characteristic of tallgrass prairie and savanna emerged following the opening of the canopy by the fire. These savannas will now be maintained through periodic prescribed burns conducted by Conservancy staff.

Long viewed as a catastrophic, destructive force on the landscape, fire is increasingly being recognized as a natural process essential for the existence of some of our most imperiled natural systems.

3. Savanna

Savannas are grasslands interspersed with trees and maintained by fire. They are generally characterized by canopy covers of less than 50%, usually comprised of oaks and pines with a few hickories. Savannas can be transitional areas between prairie and forest, but they are always undergoing successional change. Varied topography would naturally tend to favor open woodlands and savannas on the drier ridges and south- & west-facing slopes. Such areas would be characterized by a diverse and highly productive understory of grasses and forbs.

Savannas are among North America's most imperiled ecosystems. Conservation scientists estimate that these unique systems have undergone greater than 99% decline from their original coverage. Agricultural conversion and development have eliminated most of our original savannas. Those areas that avoided development quickly became dense, closed canopy forest in the absence of periodic fires. Selective thinning and prescribed burning are being used to restore savannas to a few of the places where they once occurred.

4. Oaks

Oaks are the dominant and single most important group of trees for wildlife in the Ozarks. They provide nesting sites for birds and food for numerous animals. Their hollow logs provide denning opportunities to many wildlife species including squirrels, chipmunks, raccoons, groundhogs, and opossums.

Oak acorns are a critical fall and winter food source for deer, turkey, squirrel, and other small mammals. Acorns are a type of hard mast, as are walnuts and hickory nuts. Soft mast includes the fleshy fruits of flowering dogwood (Cornus florida)., black cherry (Prunus serotina), and persimmon (Diospyros virginiana).

The oaks are divided into two broad groups---the red oaks and the white oaks. Northern red oak (Quercus rubra), southern red oak (Q. falcata), shumard oak (Q. shumardii), scarlet oak (Q. coccinea), black oak (Q. velutina), and blackjack oak (Q. marilandica) are all members of the red oak group that occur here. The red oak group is distinguished from the white oak group by the bristle-tipped lobes on leaves, hairy inner surface of the acorn nut (the nut must be broken to observe this trait), and acorns that require two years to mature. Because they require two years to mature, tiny first year acorns occur on mature trees along with the larger second year acorns. Acorns of the red oak group are usually bitter and are less desirable to wildlife. The bark of many of the oaks in the red oak group is darker than that of trees in the white oak group.

White oak (Q.alba), post oak (Q.stellata), bur oak (Q. macrocarpa), and chinkapin oak (Q. muehlenbergii) are all members of the white oak group occurring on the preserve. The white oak group has leaves with rounded, not bristle-tipped lobes. The inner surface of the acorns is smooth, and acorns are produced every year. The acorns are usually somewhat sweet and are among the first to be consumed by wildlife. Post oak and white oak (as well as blackjack oak from the red oak group) are often dominant trees in fire-maintained savannas and woodlands.

5. Savanna Wildlife

Savannas and open woodlands harbor an impressive amount of natural diversity. They seem to capture much of the diversity of both forests and prairies, while providing ideal habitat for a suite of "savanna specialists"

More than 40 species of breeding birds use savannas for their habitat needs. The most open areas may harbor kingbirds, field sparrows, and bluebirds. Shrubby zones provide ideal habitat for prairie warbler, indigo bunting, and blue-winged warbler. In the more wooded areas, the careful observer may see a great crested flycatcher or a summer tanager, or perhaps hear an eastern wood pewee or a bobwhite quail.

More than 20 species of mammals use savannas, including coyotes, bobcats, southern flying squirrels, and groundhogs. Savannas provide ideal habitat for white-tailed deer, and historically harbored herds of elk. Small mammals are abundant in the dense herbaceous cover, and these provide an ample prey base for red-tailed hawks, sharp-shinned hawks, northern harriers, and barred owls. Common reptiles include speckled kingsnake, black rat snake, fence lizard, and ground skinks.

Wildflowers come alive by mid-summer with blooms of sunflowers (Helianthus spp.), black-eyed susans (Rudbeckia hirta), mints (Monarda spp.), and coneflowers (Echinacea spp.). Savannas and open woodlands seem to provide an especially impressive display of goldenrods (Solidago spp.) and asters during the fall. Native warm-season grasses provide a picturesque cover through the cold months of winter.

6. Succession and Disturbance

A plant community refers to the associated plant species that form the natural vegetation of any place. Plant communities are in a constant state of change that results from two primary forces---succession and disturbance. These conflicting forces have shaped landscapes in the Ozarks for thousands of years.

The existing plant community and each successive community alter the environment in ways that actually promote new communities to occupy the site. These alterations of the environment include changes in the microclimate and soil conditions of the site. As plant communities undergo succession, they ultimately arrive in a "climax community". But natural disturbances like fires, tornadoes or diseases interrupt succession and may create something far different from a climax forest.

This part of the preserve has had a series of disturbances in recent years that has set back succession. The result is a mosaic of shrubland, woodland, and savanna. These plant communities will slowly evolve toward forest until the next disturbance renews the cycle once again.

7. Woodland

Areas with more trees than savanna but with sparser canopy than forest are considered to be woodland. Woodlands exhibit the same trees found in savannas, but at higher densities. The frequency and intensity of fire determines where a plant community lies between savanna and forest.

Woodlands are characterized by productive understories of woody shrubs, grasses, and forbs. Hazelnut ((Corylus americana), buck brush (Symphoricarpos orbiculatus), and sprouts of oak and hickory occur in the understory here. A variety of woodland wildflowers occur throughout, including the rare royal catchfly (Silene regia), a sun-loving species of open woodlands and savannas.

8. Grasses

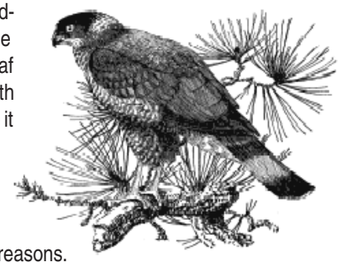
A major component of the ground cover of prairies and savannas is grasses. Four grasses dominate the tallgrass prairie, and these same species occur throughout the savannas of the Midwest. These include big bluestem (Andropogon gerardii), little bluestem (Schizachyrium scoparium), indiangrass (Sorghastrum nutans), and switchgrass (Panicum virgatum). These are all warm-season grasses; they begin their growth in spring, but do not reach full growth and seed production until the warm days of late summer and early fall.

Conservancy staff are planting a mix of grasses and forbs in restoration areas to reestablish a native ground cover. Shortleaf pine and oak seedlings will then be planted to begin the process of restoring the characteristic structure of savanna and open woodland.

Pine Ridge Trail

A. Shortleaf Pine

Shortleaf pine (Pinus echinata) is the only pine native to the Ozarks, and was once quite abundant in these hills. Some of the pine trees on the preserve are nearing old-growth, and are estimated to be around 100 years old. Shortleaf pine tends to dominate on south and west-facing slopes, where it can outcompete species less tolerant of fire and drought.



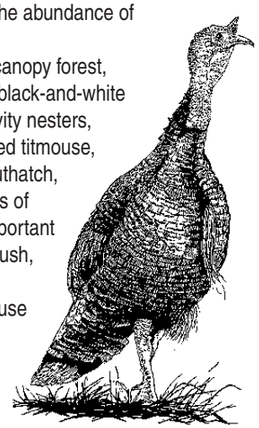
These pines are very well-adapted to fire, and actually benefit from burning for many reasons. Burning removes hardwoods, such as small oaks and hickories, decreasing competition for nutrients, moisture and space. Also, shortleaf pine seeds germinate best on bare soils. When forests don't burn frequently, leaf and needle litter accumulates to depths that hinder pine seedling establishment. Occasional fires kept the litter from becoming too deep for shortleaf pine to regenerate.

Because fires have been suppressed for several decades, the structure and composition of pine-dominated forests and woodlands of the Ozark region are much different than they were in the past. Early travelers and settlers in the region described very open pure pine woodlands with a diverse and abundant understory of grasses and forbs. Blueberry or huckleberry (Vaccinium spp) still remain in the understory of these woodlands, but productivity of berries has nearly ceased beneath closed canopies.

Nickel Preserve staff are restoring areas of pine woodland and savanna throughout the preserve. Pine seeds are harvested from trees on the preserve each fall. Seedlings are propagated and planted to restoration areas. Prescribed burns are expected to enhance open pine woodlands and stimulate pine regeneration.

B. Forest Wildlife

Many species of wildlife thrive in a maturing oak-pine forest. Forest structure allows for greater partitioning of habitats by species. Wild turkey, white-tailed deer, and black bear populations have rebounded notably in recent years, partly due to the abundance of favorable forest habitat.



Some songbirds flourish in closed-canopy forest, including blue jay, red-eyed vireo and black-and-white warbler. Forests harbor numerous cavity nesters, including great-crested flycatcher, tufted titmouse, Carolina chickadee, white-breasted nuthatch, and several woodpeckers. Large tracts of unfragmented forest are especially important for ovenbird, scarlet tanager, wood thrush, and Kentucky warbler.

More than 20 species of mammals use forests, including coyotes, bobcats, squirrels, and chipmunks. White-tailed deer are dependent on the abundant oak mast during fall and winter. The moist forest floor and abundant downed logs provide good habitat for salamanders such as the ringed salamander, western slimy salamander, and southern redback salamander. A box turtle may be seen resting in the shade of the forest.

C. Topography

This narrow ridgetop is an ideal place to observe the effects of topography on plant communities. South- and west-facing slopes tend to be dry and droughty, with more intense fires. Pine, huckleberry, and post oak are well-adapted to such conditions. The more moist north slopes and bottomlands do not carry fire as well, and favor a more closed-canopy forest with a greater diversity of hardwood trees and shrubs.

This stratification in plant communities creates a remarkable variety of habitat types that leads to a greater number of birds, herps, mammals, and insects within the landscape as a whole.

D. Oak-Pine Forest

Forests, as opposed to more open woodlands, have a closed canopy and a thick understory. Forests on the preserve are dominated by oak and pine. Multiple layers of canopy trees and shade-adapted shrubs and saplings occur. These forests often contain more fire-sensitive trees and shrubs, such as northern red oak, sugar maple (Acer saccharum) and flowering dogwood.

A diverse mix of deciduous trees and shrubs occur on the various slopes and bottomlands in the Ozarks. In addition to the dominant oaks and hickories, look for elms (Ulnus spp), blackgum (Nyssa sylvatica), sassafras (Sassafras albidum), serviceberry (Amelanchier arborea), rusty blackhaw (Viburnum rufidulum), and huckleberry (Vaccinium spp.) in the understory.

E. North Slope Plant Community

Sheltered from the sun and wind, north slopes harbor a unique array of trees and shrubs. Common species include sugar maple, white oak, serviceberry, and dogwood.

Here you will find shade-loving herbs such as wood mint (Cunila organoides), wild geranium (Geranium maculatum), blue star (Amsonia illustris), and wild iris (Iris cristata). Look for an exquisite variety of ferns from delicate maidenhair (Adiantum pedatum) to the more robust Christmas fern (Polystichum acrostichoides).

F. Bottomland Forest

Thousands of years of scouring rainwater have formed broad flat valleys where stream channels have meandered over time. These moist "hollows" occur as fingers throughout the highly dissected landscape. The deeper, loamy soils provide the ideal substrate for bottomland forest.

Sycamore (Platanus occidentalis), red oak, red maple, walnut (Juglans nigra), and green ash (Fraxinus pennsylvanica) are common throughout bottomlands. Understories may include dogwood, Carolina buckthorn (Rhamnus caroliniana), pale buckeye (Aesculus glabra), hazelnut (Corylus americana), and spicebush (Lindera benzoin). These are among the most productive sites for forage for all types of wildlife.

Early spring brings a carpet of ephemeral wildflowers, from the tiny false rue anemone (Isopyrum biternatum) to the distinctive may apple (Podophyllum peltatum). Wild ginger (Asarum canadense) and bloodroot (Sanguinaria canadensis) are among the many spring herbs used by native Americans. Summer and fall mast crops--- berries, fruits, nuts, and acorns---are especially abundant in bottomland forests.