USDA United States Department of Agriculture

Hoosier National Forest

Buffalo Springs Area Newsletter

Greetings Forest Neighbors and Partners,

As stewards of the land, we are entrusted by you to take a holistic look at forest ecosystems and make informed decisions about the future direction of those ecosystems and any needed management actions to improve conditions . An important part of that process is reaching out to you for your information and ideas. This newsletter is a new format we are trying to share information about a current area of interest (see map on page 2). It is intended to give an overview of the known current conditions of the forest in that area.

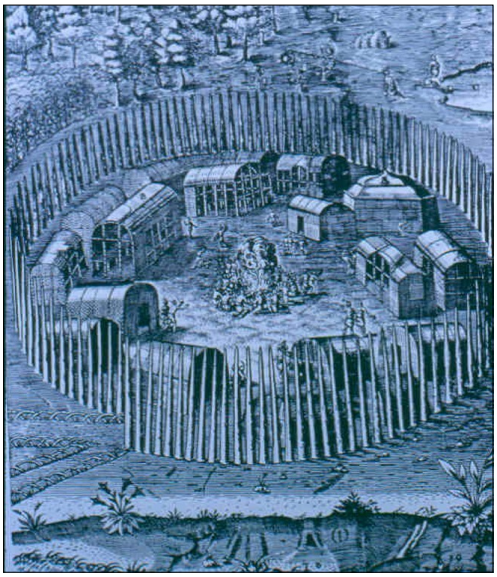
Another new method for us to engage with stakeholders, especially when holding a large public meeting is not advised, is video presentations on our website for you to view soon at your convenience. These short videos will give a little more detail than you will find in this newsletter. They will also add a more personal touch as you will get to see and hear each specialist.

I encourage you to read this newsletter, view the videos and send me your thoughts, ideas, comments or concerns about the Buffalo Springs Area of Interest. I have provided three questions at the end of this newsletter to start the conversation. I also welcome comments about the new newsletter and video formats.

- *Chris Thornton, District Ranger (acting)*

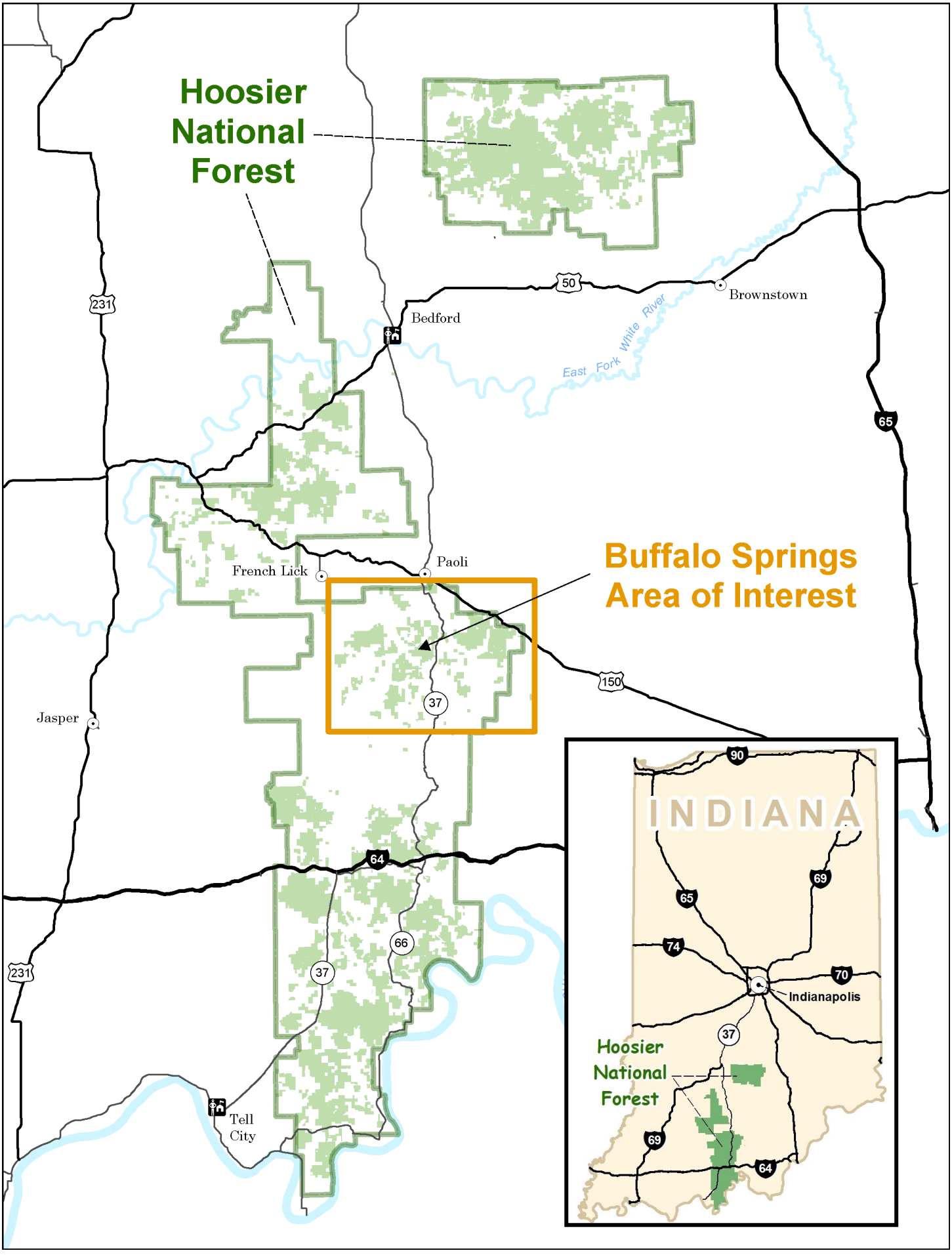
Heritage Resources

Humans have occupied the land that now makes up the Hoosier National Forest for at least the past 14,000 years. Prehistoric settlements began with the Native American Paleoindian period followed by the Archaic, Woodland, and Mississippian Traditions ending around A.D. 1650. Native American groups continued to inhabit the area into the early part of the 19th century, until treaties with the American government forced almost all of them to move westward in the 1830s. European exploration of the region began in the late 17th century with French traders exploring the Great Lakes region and the Ohio Valley, and with the establishment of military posts in the 18th century. European-American and African American settlement followed in the 19th and 20th centuries.



Lithograph depicting what the Oliver Phase village may have looked like.

Past human occupation of the Buffalo Springs area is evident in over 300 sites that have been recorded to date. With continued surveys it is likely that hundreds more will be identified in the future. Of those already identified, about a third are classified as prehistorically occupied rockshelters, a third are classified as prehistoric open-air sites, and much of the remaining third are historic homesteads and farmstead sites.


Hoosier National Forest
Buffalo Springs Area of Interest
Bedford
Brownstown
French Lick
Paoli
Jasper
Tell City
East Fork White River
231
50
65
150
37
64
66
INDIANA
90
69
74
70
Indianapolis
Hoosier National Forest

Other site types that occur include those associated with works of the Civilian Conservation Corps, and the remains of early industries such as kilns and stone quarries. Early transportation routes cross the forest that served as Native American trails, animal migration routes, military roads, and access to the Northwest Territory in the 17th and 18th centuries.

One important archaeological site in the Buffalo Springs area is a prehistoric site known as the Cox's Woods Site. Native Americans occupied a village at this location during a period within the Mississippian Tradition called the Oliver Phase, from about A.D. 1000 to 1500. Oliver Phase people, who primarily inhabited the White River valley and East Fork of the White River valley, lived in villages near floodplains, which were used for agriculture. A double-walled post stockade designed for defense encircled the village at the Cox's Woods Site. Archaeological investigations were conducted in and around the site in the 1990s and in 2010 to determine the extent of the village and gain some insight into the daily lives of these people. While the village is no longer visible on the ground surface, interpretive signs can be viewed in the Pioneer Mothers Memorial Forest.

A significant early transportation route that traverses the Buffalo Springs area is known as the Buffalo Trace. This historic pathway originally formed by the repeated seasonal migration of large herds of bison across what is now southern Indiana. Travelling from summer feeding areas in the Great Plains, to protected areas in Kentucky for the winter, they wore trails into the earth from 12 to 20 feet wide and up to 12 feet deep. The Buffalo Trace formed between A.D. 600 and 1100, and the pathway was subsequently used by Native Americans and early European settlers for travel, trade, and to move livestock. In the 1800s, it was used as Indiana's first postal service route and stagecoach line. The Trace was improved and officially designated a post road on March 22, 1800. It was said to be the first "western" mail route, carried weekly, by two men traveling the 130-mile route on foot. During the mid-1800s when the Buffalo Trace was at its busiest as a stagecoach line, taverns and inns were built along the route to cater to the many travelers. Later in the 19th century new roads were built, and they only occasionally followed the old route of the Buffalo Trace. Slowly, the Trace fell into disuse and only vestiges can now be found of what had been the superhighway of the pioneer day.

Initial Point, located south of Paoli just off Highway 37, marks the beginning point of the Public Land Survey System (PLSS) in Indiana, and was first surveyed and monumented by Ebenezer Buckingham, Jr., U.S. Deputy Surveyor, on September 1, 1805. The PLSS is an important system that continues to be used for locational legal descriptions throughout Indiana, and much of the country, today. Initial Point has been important to the local community for many years, known locally as Pivot Point, since at least the 1960s.

Another significant aspect of southern Indiana's rich history within the Buffalo Springs area is the Lick Creek African American Settlement in Orange County. Indiana's first constitution explicitly banned the practices of slavery and indentured servitude, which created an opportunity for those seeking to escape the practice in other parts of the country. The migration of African Americans into Indiana led to the development of dozens of settlements during the 19th century, including the Lick Creek Settlement. The first African Americans moved to this location from North Carolina in 1811, and the earliest land purchases within the settlement occurred in 1831. These free Black settlers were the first to purchase this land from the government. By 1850 the settlement was 1,600 acres in size with a population of 250 people. Land records indicate it was a racially integrated community with whites and blacks owning adjacent properties and living and working next to each other. The nearest town of Chambersburg had a store, tavern, blacksmith shop, wagon maker, and post office. It was reportedly a station on the Underground Railroad. A steady population decline at Lick Creek began at the start of the Civil War. The last African American landowner in the settlement, John Chavis, sold his land in 1911. Most of the buildings and farmhouses are no longer standing, although the still active Quaker Lick Creek Church and cemetery is located two miles east of Paoli. So far, archaeological excavations have occurred at five farmsteads and at the Union Meeting House site within the Lick Creek Settlement. These excavations can provide a fascinating glimpse into what life was like during this period, and an exhibit

from these excavations can be viewed at the Indiana State Museum.

Cave and Karst Resources

This area has some unique cave and karst features distributed throughout it. There are over 20 caves in the area and numerous karst features such as sinkholes, swallow holes and sinking springs. The entirety of the area has not been ground-truthed. Most of the karst surveys occur during winter months when vegetation has died back. Karst surveys will continue for the next several months. LiDAR is also used to remotely survey for these unique areas with promising results and allows us to identify areas to investigate on the ground.

There are no federally endangered karst invertebrates that occur on the Hoosier National Forest. There are, however, 37 Regional Forester Sensitive Species (RFSS) that can inhabit caves, and in some circumstances, sinkholes that occur in this area. The greatest threat to these karst invertebrates is sedimentation.

Wesley Chapel Gulf is part of the Lost River system .

Fisheries Resources

A total of 33 native fish species have been collected in the watersheds of the Patoka River and the Lost River in Orange County. These fish represent a mix of intolerant (of low dissolved oxygen and poor water quality) and tolerant species, which is an indicator of a healthy and diverse aquatic ecosystem in these tributaries. Headwater species (those found in small streams) include least brook lamprey, fantail darter and southern redbelly dace. Larger river species include spotted sucker, golden redhorse, and smallmouth bass. One species, the tadpole madtom, was collected for the first time since the early 1900s in a tributary of Patoka Lake. Despite efforts to remove native stream fish when the lake was built, most species have survived and now thrive in the watershed above the lake.

There are at least six known inadequate stream crossings that impact fish habitat and contribute to water quality concerns.

A barrier to fish passage in a stream.

A tadpole madtom found in the area.

Botany Resources

Vegetation in this area is typical of the central hardwoods region, and varies primarily by locations on the landscape and the tree overstory components. Ridgetops and upper south facing slopes have species adapted to drier microclimates, while north facing slopes and bottomlands contain species adapted to moister (mesic) microclimates. Within the Hoosier National Forest there are no federally threatened or endangered plant species. There are a couple of Regional Forester Sensitive Species (RFSS) known to occur within the area: American ginseng (*Panax quinquefolius*) and Illinois wood-sorrel (*Oxalis illinoensis*). These two species are two of our more common RFSS that are found in multiple locations across the Hoosier National Forest. The primary threat to American ginseng is illegal digging of the plant roots for local or commercial medicinal use though collection of this species is illegal on the National Forest. Illinois wood-sorrel is a perennial herb associated with calcareous soils in mesic bottomlands that requires dappled light.

Volunteers often assist in the removal of invasive plants.

Non-native invasive plant species (NNIS) are scattered across the Hoosier National Forest and are also present in this area. Species known to occur within the area include tree-of-heaven (*Ailanthus altissima*), garlic mustard (*Alliaria petiolata*), honesuckles (*Lonicera* sp) – both bush and vine, multiflora rose (*Rosa multiflora*), autumn olive (*Elaeagnus umbellata*), privet (*Ligustrum vulgare*) and Japanese stiltgrass (*Microstegium vimineum*). These are some, but not likely an all-inclusive list of NNIS that occur in the area. The Hoosier National Forest treats NNIS across the Forest using both mechanical and chemical methods. Decisions on what species to treat and where are prioritized by the botany staff, with highest priority on Early Detection and Rapid Response (EDRR) to populations of new NNIS not known prior in southern Indiana and those NNIS that threaten rare or critical habitats or species. The NNIS control program is limited to the amount that can be done with available resources.

Illinois wood-sorrel
photo credit: Chris Evans, Univ. of Ill., Bugwood.org

Forest Resources

- **Forest Inventory**

In summer of 2019 a vegetation inventory was conducted on Hoosier National Forest lands located in portions of the Lost River and Patoka Lake-Patoka River watersheds. Standard Forest Service inventory procedures, known as Common Stand Exam (CSE) protocols, were utilized. Data collected from 1,550 CSE plots was used to assess existing forest conditions at the stand level on roughly 11,105 acres within the area of interest. The following is a summary of the current forest conditions found during the inventory and the factors that created them.

- **Forest composition**

Prior to European settlement, the use of fire by Native Americans allowed fire adapted species to flourish for centuries in eastern hardwood forests. This included oak and hickory species that often rely upon low- to moderate-level burns to help their seedlings compete against more fire sensitive species. As European settlers began to populate the east, they altered this disturbance regime, often increasing fire frequency and introducing other disturbances such as grazing, which further benefitted disturbance adapted oak and hickory. Much of the area in this inventory reflects this past disturbance regime. The area is currently dominated by the oak-hickory forest type which covers roughly 59% of the area. Typical species found in upper canopies included white oak, black oak, pignut hickory, and shagbark hickory. As fire and other disturbances were excluded from ecosystems in the early- to mid-20th century, oak-hickory seedlings no longer held a competitive advantage and are now being replaced. Subcanopy positions are currently dominated by shade-tolerant species such as sugar maple and American beech.

Non-native pine species were planted throughout the area during the mid- to late-20th century on abandoned farm fields to help repair degraded soils and reduce further erosion. Pure and mixed stands of shortleaf pine, Virginia pine, and eastern white pine currently comprise 27% of the area.

The beech-maple forest type comprises the final 14% of inventoried acres. This forest type is more prominent on north and east facing slopes, as well as lower slope positions, where past disturbances from fire were less frequent and/or less severe. This allowed many fire-intolerant species like sugar maple, American beech, red maple, and tulip-poplar to thrive and dominate contemporary stands.

- **Forest Age**

Nearly 77% of hardwood stands in the area currently average 60 years of age or older (Fig. 1). Only 3.7% are less than 30 years of age, with only 0.1% less than 10 years of age. The slight uptick in the 30-39 year age class can be attributed to the regrowth of hardwoods that were managed as even-aged stands by the Forest during the 1980s (Fig. 1, next page). Roughly 99% of the non-native pine stands in the area are 30 years of age or older. The highest proportion of non-native pine stands fall between the ages of 50 and 70. This illustrates the reforestation practices that took place on abandoned cropland from the late 1930s to around 1990.

- **Forest Health**

Data collected during this inventory indicates that most stands in the area are overstocked, or too crowded for the water and sunlight resources available leading to greater competition. This often leads to stagnated growth and makes trees more susceptible to attacks from forest pests and pathogens. In 2019 the area was surveyed by forest health specialists for insect and disease issues. Issues encountered included oak wilt in red oak, oak decline in chestnut oak, and white pine needle disease. Furthermore, a significant defoliation event occurred in spring of 2020 that affected black and scarlet oak in the area. The event was a combination of three stressors including a late freeze, oak anthracnose (leaf fungus), and oak shothole leafminer (a defoliating insect). It likely reduced overall growth and reproductive capacity of these trees during the 2020 growing season.

Effects of oak shothole leafminer were found in oaks across the Forest in 2020.

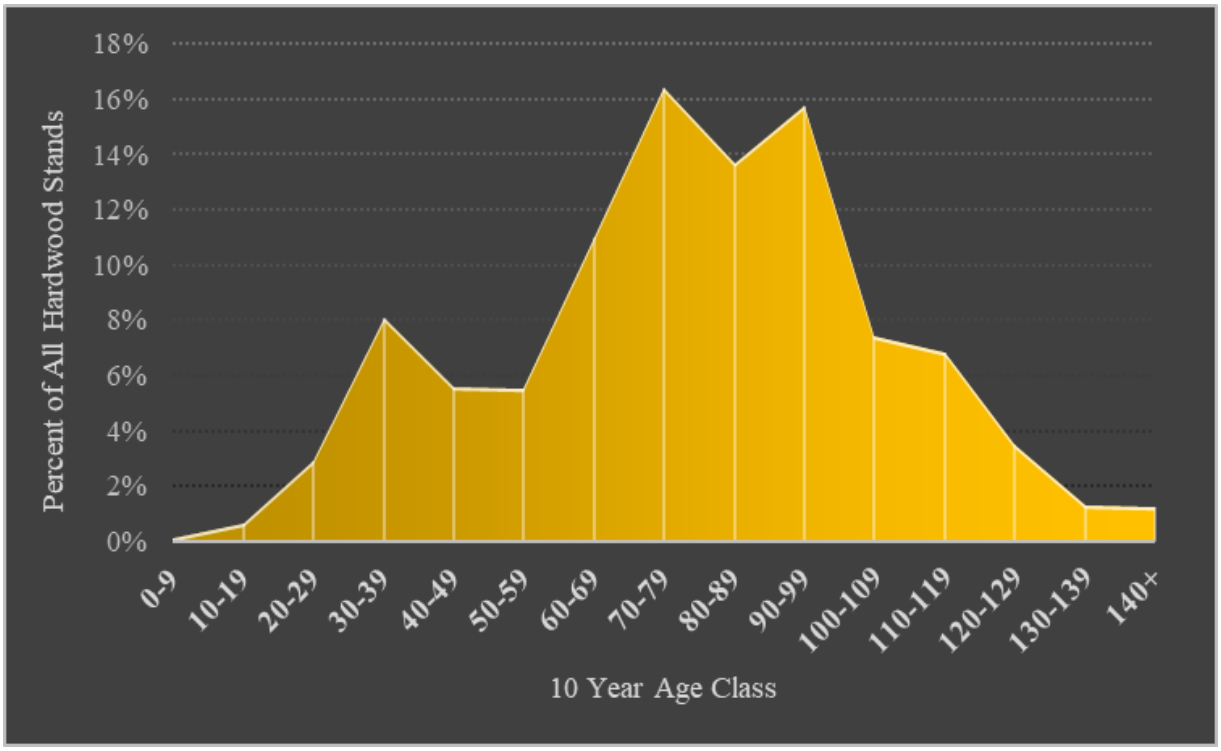


Figure 1. Age class distribution of hardwood stands in inventory area.

Geologic, Hydrologic and Soil Resources

This area contains the Lost River and Patoka River watersheds, which reside within the Crawford Uplands physiographic region. This region extends from just south of Spencer in Owen County, to the Ohio River in Perry County, Indiana. Due to glacial out wash, there are many areas of exposed bedrock here. The bedrock consists of shale, sandstone and limestone of the Mississippian and Pennsylvanian Periods. Sinkholes, karst valleys, and caves are common throughout the landscape.

The Lost River watershed has a unique groundwater and surface water relationship due to the many springs, sinkholes, and caves. The Lost River is named for its ability to go from surface water flow, like most rivers, to underground flow and water storage through a network of karst conduits such as caves, fractured bedrock, and sinkholes. This direct connection from streamflow to the groundwater aquifer storage creates a dynamic, unpredictable hydrologic system.

Karst is composed of highly erodible limestone which erodes from slightly acidic surface water runoff from precipitation. In areas of exposed bedrock, or thin to non-existent soils, acidic rain cannot be filtered enough to prevent bedrock erosion, which leads to the formation of caves and sinkholes. In these karst systems, surface water and groundwater function as one, flowing through streambeds and into sinkholes and caves, which store water underground near the surface creating springs. Flooding is dependent on the status of water storage within the karst cavities. A drought may cause the streamflow to submerge underground leaving a dry streambed.

The Lost River.

The Patoka River watershed has a similar, but not as complex, hydrologic system. In addition, it is a municipal watershed, where water quality is of utmost concern.

Soils are rated from moderate to poor on productivity and erosiveness. A common soil here is the Apalona-Zanesville silt loam, which rates mediocre to poor in productivity. In many areas, the soils are thin, with little topsoil or subsoil laying over the top of the bedrock parent material. There are some high relief areas which attribute to highly erodible soils.

Although water quality on National Forest System lands here has been observed as good, there are water quality risks that always need to be addressed. Erosion and sedimentation are the greatest risks imposed on Forest lands. Erosion issues caused by trail traffic, road traffic, surface water runoff, or stream flow are monitored and identified for improvements as funding allows. Stream crossing improvements, road and trail maintenance, general erosion repair and sustainable vegetation treatments are all common erosion and sedimentation mitigations to improve water quality.

An entrenched forest road has trapped water run-off causing rutting and erosion issues.

There are at least six known inadequate stream crossings that impact fish habitat and contribute to water quality concerns. In addition, several areas on Forest trails and roads have been identified which are in need of improvements to reduce erosion and improve water quality.

A county road crosses a stream which is a tributary of the Patoka River.

Trees, soils, and other vegetation act as filters and can remove some impurities such as nutrients in run-off water before it enters the groundwater network. Vegetation also holds soils in place, mitigating sedimentation in these water bodies. Maintaining healthy vegetative buffers around sink holes, caves and springs contributes to good water quality. Fish presence is a good indicator of long-term water quality. Current data on fish in the tributaries of this area indicates overall water quality is good on National Forest System lands, however the Indiana Department of Environmental Management has identified impaired streams within the watersheds that are negatively affecting water quality. Sustaining good water quality within the watersheds is dependent on healthy, resilient, sustainable forests across the landscape.

Wildlife Resources

All wildlife species have the same four basic habitat requirements – food, water, shelter, and space. However, each species requires different kinds and combinations of food or shelter. Riparian corridors, or habitats along streams and rivers, provide connectivity across long reaches of land and also serve as movement corridors for wildlife. A healthy natural community benefits multiple game and nongame species.

Since 1991 breeding bird surveys have been conducted across much of the Hoosier National Forest during May and June. There have been nearly 18,000 observations of 93 bird species in the Buffalo Springs area. Thirty-nine species are associated with non-forested open habitats such as openings and wetlands. Eighteen species have been identified by the Central Hardwoods Joint Venture as having regional conservation concerns and are about evenly divided between forest-woodland and grass-shrubland habitats (see table).

Central Hardwoods Joint Venture Priority Bird Species known to occur in the vicinity of the Buffalo Springs area of interest (Regional Forester Sensitive Species (RFSS) indicated by an asterisk *)

Forest-Woodland Species	Grass-Shrubland Species
blue-gray gnatcatcher	blue-winged warbler
cerulean warbler*	brown thrasher
eastern wood-peewee	eastern towhee
Kentucky warbler	field sparrow
northern flicker	northern bobwhite
red-headed woodpecker	prairie warbler
whip-poor-will	white-eyed vireo
wood thrush	yellow-breasted chat
worm-eating warbler	
yellow-billed cuckoo	

Breeding bird surveys have documented the occurrence of birds of prey such as barred owl, great horned owl, osprey, broad-winged hawk, red-shouldered hawk, and red-tailed hawk. Ospreys are successfully hatching and rearing young on the artificial nest platform erected at Patoka Wetland in fall 2014.

Detections of birds associated with wetlands include Canada goose, great blue heron, and red-winged blackbird. Incidental observations have documented successful reproduction by Canada goose. Nest boxes for wood ducks have been installed to supplement naturally occurring tree cavities in the area.

Wild turkeys and mourning doves are two upland game bird species known to occur in the area. Turkey nests have been found.

A fledgling cerulean warbler (Scott Stoleson, USFS)

Surveys for mammal species in the area have only focused on bats. Mist nets, used to physically capture bats, were deployed along the Patoka River in 1990, 2010, 2011, and 2014. A total of 58 bats (6 species) were caught. Gray bats were detected using acoustic monitors near mist net sites, but not captured.

White-nose syndrome, caused by a fungal infection that kills bats, was first detected in bats hibernating in caves on the Hoosier National Forest in 2011. As a result, all caves on the Forest are closed to the public between September 1 and April 30 to prevent the spread of the fungus.

Bat species known to occur in the vicinity of the Buffalo Springs area of interest

Bat Species	Conservation Status
big brown bat	
gray bat	endangered
hoary bat	
Indiana bat	endangered
little brown bat	RFSS
silver-haired bat	
tri-colored bat	RFSS

Springs Valley boat launch.

The distribution of young forests and other open habitats may be at the low range of historic conditions and may be below that needed to sustain desired population levels of many wildlife species. Early-successional wildlife habitats have now become critically uncommon in much of the eastern United States, largely in response to forest maturation due to lack of disturbance. Most birds associated with open habitats have declined in eastern North America since at least the 1950's. Populations of mammals that depend on early successional forests or shrub-dominated habitats are declining in portions of the eastern United States as well.

Recreation Opportunities

There are four developed recreation areas within the area of interest – Youngs Creek Horse Camp and Trail System, Springs Valley Boat Launch and Trail, Pioneer Mothers Memorial Trail and the Lick Creek Trail. Together these areas provide nearly 32 miles of multiple use trails (hiking, biking and horse riding) and over a mile of hiking only trail. Youngs Creek provides primitive camping. The 141-acre Springs Valley Lake offers opportunities for fishing, boating, paddling and wildlife viewing. The area has approximately 19,000 acres of National Forest System land available for hunting and dispersed camping. The Pioneer Mothers Memorial Forest is an 88-acre old growth oak-hickory forest that along with a 165-acre buffer, is managed to protect its unique qualities and is a National Natural Landmark.

Fuel and Fire Conditions

Fuels available for burning in a wildfire, such as leaves, grass, twigs, and downed logs have accumulated in this area. Of particular concern are the non-native pine stands, which are susceptible to mass-mortality events, such as windthrow or disease, which can suddenly and rapidly increase the fuel loading in any given area. This increase in available fuels can be more than 10-fold normal levels. Should a fire become established under certain conditions, containment would be almost impossible to achieve without greatly expanding the fire area to reach areas where fuels loading, and thus fire behavior, is subdued and conducive to suppression activities. Prescribed burning to reduce fuels and benefit ecological processes has not been conducted on National Forest system lands in the Buffalo Springs area for at least 20 years.

Climate Change Effects

As we adapt to the effects of climate change, its impacts must be considered when managing the forest. Under both low and high carbon emission scenarios, we will experience warmer and dryer summers and precipitation will increase in the winter and spring. Extreme weather events will become more common as well. With these stressors, it's important to consider the health and composition of the forest as our climate changes. When climate change is coupled with existing problems such as overly dense stands or exotic pests, we start to see tree mortality. Currently the Hoosier National Forest is a carbon sink (carbon storage is increasing). Long term modeling suggests the forest could become carbon neutral or a source of carbon in the future due to dead, decaying wood.

We want to hear from you!!

We've shared some of our knowledge of the natural and cultural resources in the Buffalo Springs Area of Interest in this newsletter, and we'll have more detailed information for you to view in video format on our website in February, 2021 at https://go.usa.gov/xAn24. We'd like to hear from those in the local community, interested organizations, and forest visitors. We'd appreciate your thoughts by early March, 2021. There are a variety of ways to respond to the following questions:

Call: 866-302-4173 (toll-free)

Fax: 812-279-3423

Mail: Attn: Public Affairs, Hoosier National Forest, 811 Constitution Ave., Bedford, IN 47562

Email: Public Affairs Specialist, Marion.Mason@usda.gov

Video: If you would prefer to submit a video of yourself or others discussing the responses, email the video to Public Affairs Specialist, Marion.Mason@usda.gov. If the file is too large to send via email, contact Marion Mason to make alternate arrangements.

Include your name and preferred contact information to be contacted about this area in the future. Feel free to use additional pages.

1. What knowledge or information would you like to share with the Forest Service and the community about the Buffalo Springs Area?

2. What concerns do you have about the current condition of the forest in the Buffalo Springs Area?

3. What is your preferred method of communicating about this issue in the future (please include contact information)?