

The WOODland Steward

Promoting the Wise Use of Indiana's Forest Resources

The Department of Forestry and Natural Resources at Purdue University – Celebrating 100 years

By Bill Hoover

The formation of Purdue's Department of Forestry was driven by the same factors that led to the establishment of the State Board of Forestry (House Bill 192, Approved March 1, 1901). It became the Division of Forestry in March 1919 under the leadership of Col. Richard Lieber. Purdue Professor of Biology, Stanley Coulter, represented Purdue in the many efforts made to improve the forests of Indiana during these formative years. He was a member of the State Board of Forestry from its formation until 1935. He is the founder of Purdue's forestry program. The factors influencing his interest in forestry and the profession of forestry are the story of forestry in Indiana from 1890 until the early 1930's.

Stanley Coulter, Professor of Biology, and later Dean, School of Science, and first Dean of Men, was directly responsible for the first forestry course offerings and creation of an elective forestry curriculum. His field of science was botany specializing in taxonomy. His interest in the taxonomy of tree species expanded to forestry in general and the need to practice forestry in Indiana. He published a series of articles in the *Annual Reports of the State Board of Forestry* identifying the condition of farm woodlots, needed improvements, and an outline for their management. Articles started in the 1903 Report although the authors are not identified. The first article under

cont'd on page 4



A very progressive class for Purdue forestry students Forestry students. Here they demonstrate for the camera multiple-use forest management. (FNR Archives)



A fully grown ALB larva. These voracious larvae create 1/2" wide tunnels through wood. See page 9 for more.

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visit us online at
www.inwoodlands.org

Calendar of Events

March 23

Tri-State Woodlands and Wildlife Conference

Clifty Falls State Park, Madison
See www.tristatewoods.org for details
or to register.
Contact 812-265-8919 or email
lmason1@purdue.edu

April 3

Historic Hoosier Hills RC&D Annual Awards Banquet

6 PM
The Pines, Madison, Jefferson County
RSVP to 812-689-4107 or
h hills@seidata.com.

April 5-6

Tree Farm Forest Landowners Clinic

Abe Martin Lodge, Brown County
State Park
Contact lfarlee@purdue.edu or
765-494-2153.

April 6

Family Nature Fest

9-Noon
Ferdinand State Forest, Dubois
County
Forest and wildflower walks, fishing.
Contact 812-367-1524

April 20

Wildflower Hike

White River RC&D
Contact 812-276-4757 or
tligman@fs.fed.us

April 20

Indiana Chapter Walnut Council field day

Clinton County
Contact jackson@purdue.edu at
765-583-3501

July 17

Indiana Urban Forest Council summer meeting

Contact director@iufc.org

**Did You Know The Woodland
Steward is Online?**

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*The opinions expressed by the authors
do not necessarily reflect those of
the Woodland Steward Institute.
The objectives of the newsletter are
to provide general and technical
natural resource information to
woodland owners of Indiana, improve
information distribution and build
support for responsible forest resource
management.*



Woodland Steward Newsletter – Letter from the President 2013

Woodland Owner Tipping Point

I am in the process of reading the book *The Tipping Point, How Little Things Can Make a Big Difference* by Malcolm Gladwell. The concept and first few chapters have me thinking about woodland owners. Tipping point can be defined as “the moment of critical mass, the threshold, the boiling point.” The book starts out talking about how researchers have looked back to see what the tipping point was in fashion trends, disease outbreaks and even restaurant popularity. They suggest three rules for reaching the tipping point – the Law of the Few, the Stickiness Factor, and the Power of Context. To put it simply, find the right person or subject, package it the right way, and be aware of your situation and environment.

How do landowners prioritize what they want to do and what motivates them to make a forest management decision or act on management recommendation? What is their tipping point?

The first time I met with one of my favorite landowners they did not want anything to do with invasive plants. They had other plans for their property. They wanted trails, food plots, planted prairie and maybe some Forest Stand Improvement. They were getting advice on these other topics from other resource

professionals. I felt the information I provided them on invasive plants was not sticking. Maybe invasive plants were not the right subject, maybe I did not present it the right way, and maybe the landowners were not aware of the problems or threats caused by invasive plants. Whatever the problem, I did not trigger a tipping point for the landowner in regards to invasive plants.

They worked on other projects for a few years, but eventually they hit the tipping point on invasive plants. They now aggressively control invasive plants on their property and sponsor and promote Brown County Nature Daze, an invasive species awareness and control field day for landowners across the state. I still don't know what the tipping point was, but I suspect it was a combination of landowner priorities and awareness.

One of the main themes in *The Tipping Point* is trying to identify what makes someone or something reach the tipping point. By knowing where the tipping point is you can be better prepared to make decisions or act when the time comes. The Woodland Steward Newsletter helps landowners be prepared when they hit their tipping point. The information in the Woodland Steward Newsletter helps you as the

landowner make informed decisions, and prepares you for upcoming events, issues, and woodland management related problems.

As you read this newsletter, think about your tipping points. When do you plan to harvest timber and why? What is happening to your land beyond your life? When will invasive plants interfere with your enjoyment of your land? Will you have the right to manage your land the way you want in the future? Will the Woodland Steward Newsletter be around in the future to provide information and guidance on woodland management? Being informed and aware will help you be prepared for forest landowner tipping points.

Enjoy your woodland.

Dan Shaver
WSI President

PS - The tipping point for the last question can be avoided by making a donation to the Woodland Steward Newsletter in the envelope provide with this newsletter. Your support is needed and appreciated.

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The Department of Forestry and Natural Resources at Purdue University – Celebrating 100 years (cont'd from page 1)



John S. Wright, John E. Seybert, and Charles C. Deam, June 1944. (Photo by Frank N. Wallace, FNR Archives Accession No. CCD.MISC.PRI.012)

his name was “Forestry--Its Influence upon Animal and Plant Distribution,” Sixth Annual Report, State Board of Forestry, 1906, pp. 80-84. His later articles focused on the state of farm woodlots and the need for management based on their economic value to the farm enterprise and cash income from the sale of timber to Indiana’s growing forest products industry. He used extension publications from Cornell University and frequently cited articles in *American Forests* magazine. It was first published in 1895. He authored a series of scientific papers on forestry published in the Proceedings of the Indiana Academy of Science during the period 1891-1926. This literature made him aware of the start of professional forestry training in the east, first at the Biltmore School and Cornell (1898) and shortly thereafter at Yale (1900).

His interest in forestry led him to start teaching forestry courses in the Department of Biology at Purdue starting in the 1905-06 school year. By 1913-14 course offerings included a two-semester sequence covering Forest Botany, elements of Silviculture and Forest Mensuration, all taught by Prof. Coulter. Later courses covered additional topics, including Forest Zoology. Burr N. Prentice was hired as an instructor in forestry in 1914. At this time forestry courses were listed as such in the catalogue. Previously they were listed as biology courses. In 1926 Forestry was shifted from the School of Science and established as a department in the School of Agriculture. Under the invitation of the Head

of the Department of Horticulture the new Department of Forestry was housed in the new Horticulture Building. It was located there until the early 1970’s when it was moved to Ag. Annex I.

In order to put the new forestry program into context, Dean of Agriculture Skinner asked Burr Prentice to survey other land-grant universities to determine enrollment in forestry and the number of faculty providing forestry instruction at the undergraduate level. While the survey was underway Burr Prentice corresponded with Ralph F. Wilcox, the acting state forester. Wilcox candidly told Prentice, “Your graduates are seriously handicapped both as applicants for positions and as foresters entering the practical field by their having very little actual forestry experience.” Prentice made Skinner aware of this issue who in turn informed President Elliott, noting that “one of the greatest weaknesses of the students in Forestry that have been turned out of this institution in the past has been their lack of practical knowledge of Forestry. It is deemed desirable and essential that they get this in a camp established for freshmen. All the more prominent institutions offering Forestry have summer camps for Forestry students.”

The president and trustees supported Skinner’s request. All entering freshmen starting in 1926 were required to attend an eight-week summer forestry camp at Henryville, Indiana. The first camp was held in the summer of 1929, allowing all the students enrolled in the forestry program to participate. Several years later President Elliott and Dean Skinner came to Henryville to observe instructional activities.

Dean Coulter’s interest in trees and forestry benefited from collaboration with Charles Deam. Charles Deam’s interest in botany derived from the use of plant materials in his pharmacy practice. John S. Wright, an employee of Eli Lilly Company, had similar interests. Their shared interests are demonstrated by their publications in the Indiana Academy of Science, as was John S. Wright’s. Dean Coulter’s older brother, John Merle Coulter was a nationally recognized and widely published botanist and President, Indiana University, from 1891 to 1893. It’s reasonable to assume that John’s interactions with his brother Stanley, Charles Deam and John Wright influenced the work of all three.

Professor Prentice found time to conduct the first inventory of Davis Farm Woodlot (Prentice B, 1927. Forest survey no. 1: Herbert Davis Forestry Farm.

Unpublished report to the Department of Forestry and Conservation, Purdue University, West Lafayette, IN). The Davis Woods remains to this day Indiana's oldest and most studied old-growth forest. Other research was very applied, focusing on regeneration and woodlot management techniques. Much of this work was conducted on Indiana's first forest reserve, now Clark State Forest. There was a need for research justifying an ongoing effort to "get the cows out of the woods," and hogs, horses, and other grazing animals. A series of research bulletins of the Agriculture Experiment Station reports on this research.

The Department of Forestry was renamed the Department of Forestry and Conservation in 1956, and renamed Forestry and Natural Resources in 1974. The forestry program was first accredited by the Society of American Foresters in 1942. A curriculum in Wood Technology and Utilization was added in 1945. Wildlife instruction began in the Department of Biology in the 1926-27 school year. Instruction moved to the Department of Forestry in 1934. Fisheries and aquatic science work was initiated in 1969 with work focused on the Wabash River.

The Department continues to grow in the output of research results, extension programs, and the quality of undergraduate and graduate education. Over the last

10 years enrollment in forestry counting all four years averaged a little over 50 until 2011 when it declined to about 45. The number of forestry graduates does not meet the demand from employers. Enrollment in wildlife science peaked at over 300 in 2010 and decline to 260 in 2012.

The future of the department is very good in large part because of the faculty's ability to adapt to changes in society in general and the need for natural resource and environmental science information to inform policy decisions and advance the science of applied ecology. The Centennial of Purdue University's Department of Forestry and Natural Resources is a celebration of the lives of our graduates and the role FNR played in them. There will be celebratory activities on campus from September 20 to 22, 2013, but we hope this is just a small part of the celebration. Alumni and friends are encouraged to visit <https://ag.purdue.edu/fnr/100/Pages/default.aspx> for information and how to participate.

Dr. William Hoover is a Professor of Forestry in the Department of Forestry and Natural Resources at Purdue University. He is Chair of the Centennial Committee which is summarizing the Department's history and planning the centennial celebration later this year.

The following county SWCD's have made a contribution so that you can receive your copy of the Woodland Steward. If your county is a supporter, please thank them and let them know you appreciate the newsletter.

Brown, Carroll, Clark, Clinton, Crawford, Dearborn, Decatur, DeKalb, Dubois, Fayette, Floyd, Franklin, Fulton, Greene, Hancock, Harrison, Hendricks, Howard, Jefferson, Johnson, Knox, LaPorte, Lawrence, Miami, Monroe, Owen, Parke, Perry, Pike, Putman, Rush, Scott, Starke, Tippecanoe, Vermillion, Wabash, Warren, Washington, Wayne and Wells.

If your county SWCD is not a Woodland Steward Supporter, please encourage them to support the Woodland Steward in 2013.



Bats in Your Woods

By Joy O'Keefe

Most people associate bats with caves and it is true that caves are important as refuges where bats hibernate during winter. However, in eastern North America most bat species, including the federally endangered Indiana bat (*Myotis sodalis*), head to the woods when they leave caves in spring.

Forests are important to bats

Many species of bats in the Midwest roost in tall, large diameter trees during the day. Some species roost in foliage, while others roost under bark or in crevices in live or dead trees. Species like the big brown bat (*Eptesicus fuscus*) are likely adapted to using hollows in very large trees, but these types of trees are no longer common on the landscape. Therefore, this species has shifted to using manmade structures like barns and attics.

In general, Midwestern bat species forage for insects in open areas and along edges created by roads, streams, or edges between different habitat types. The specific areas used depend on the bat's size and shape, and the types of echolocation calls it uses. Smaller bats are better able to maneuver in areas "cluttered" with vegetation and tend to use small openings like canopy gaps in dense forests. Larger species tend to forage in large openings like fields and clearcuts, along larger streams or roads, and above the tree canopy.

The Indiana bat is one of several bats that use forests in the Midwest during summer. Indiana bats adapted to using trees in summer at a time when forests were more common on the landscape. Pre-settlement, forests covered about 85% of Indiana's acreage; now only 20% of Indiana is forested. Most of the remaining forest land is owned by private woodland owners. Therefore, it is important for private landowners to understand how Indiana bats use forests and how forest management might affect this species.

Indiana bats and forests

From mid-Spring to mid-Fall, Indiana bats form maternity colonies of up to 200 adult females in forested areas across much of the eastern U.S. In the Midwest, female Indiana bats and their pups usually roost in large (18 inches in diameter and larger) dead trees. Hardwoods like cottonwoods, hickories, oaks, ashes and elms are often favored, but the species of tree is less important than its characteristics. Trees with peeling or sloughing bark that receive a lot of sunlight are used most often.



*An adult female Indiana bat (Myotis sodalis),
by Vanessa Rojas*

However, female Indiana bats sometimes roost in crevices in damaged or dead trees, under peeling bark on live trees such as shagbark hickories, or in manmade structures like bat boxes. Adult males tend to roost alone and use a much broader array of tree types and sizes, with the smallest known roost being less than 3 inches in diameter.

Indiana bats mate in the fall at their hibernation sites and females store sperm overwinter. After arriving on their summer range, females become pregnant in late April or early May. Females select a patch of woods with at least one large suitable dead tree or snag and, typically, a suite of other snags in various sizes and stages of decay. On a day-to-day basis, individuals move amongst different snags and, across a particular season, the entire colony may shift from one roost tree to another. These "switches" likely relate to the warmth of the roosts, as this can affect bats' energy requirements. However, bats may also switch roosts to learn about alternate roosts, reduce parasite loads, move closer to foraging sites, or simply to socialize with other bats. Populations and individuals are remarkably faithful to maternity sites; for example, a colony has used the same tract of woods near the Indianapolis airport for at least 20 years.

On the landscape scale, Indiana bats often roost in bottomlands or riparian areas near streams. In the Midwest, riparian areas may be favored because they

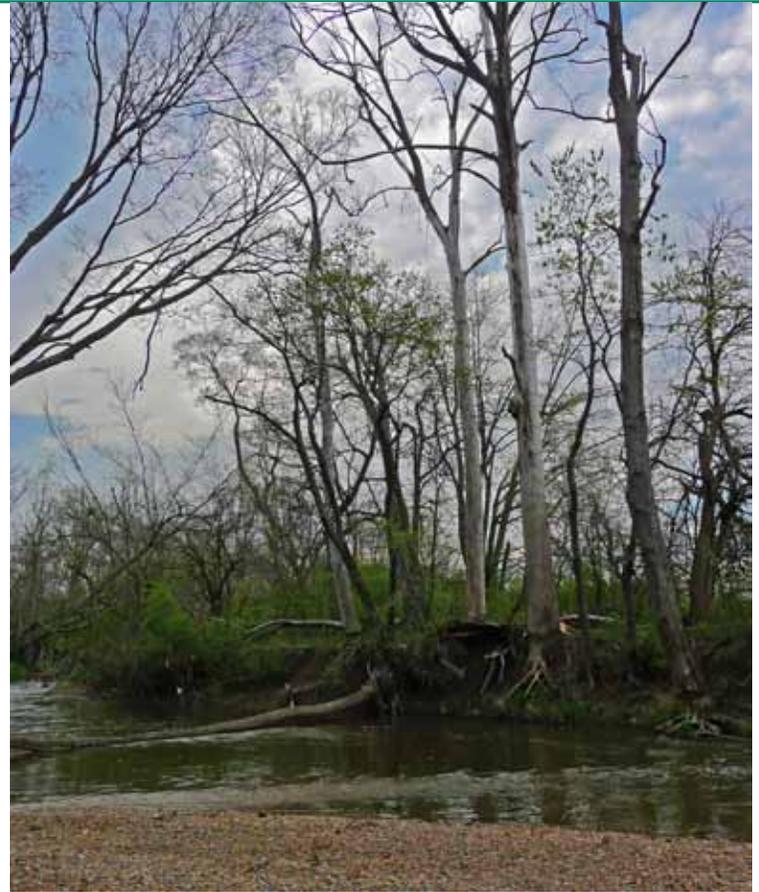
contain larger trees or it may be that bats prefer roost sites near foraging sites over streams. Adult female Indiana bats seem to prefer roosting in snags in small openings or along edges, but surrounded by live trees. Researchers think females select trees in openings to optimize the amount of sunlight on the tree which helps warm the growing pups in the roost. Because openings and edges make good foraging sites, female Indiana bats may also roost near these features to minimize the distance they need to travel each night. While females tend to roost in mature forests, male Indiana bats sometimes roost in open stands such as recently harvested areas even when potential roosts in mature forests are readily available.

In summer, a tiny (0.3 oz) pregnant or lactating female Indiana bat may spend almost the entire night hunting for insect prey, traveling up to several miles away from the maternity roost. Indiana bats primarily feed on moths, flies, beetles, and caddisflies, and may opportunistically eat a few other insect types that are occasionally abundant (e.g., winged ants). At a landscape scale, Indiana bats tend to focus on forested areas while foraging, but at a smaller scale they use open fields, riparian buffers, and other edges, in addition to foraging in the interior of mature forests. In areas where forests are fragmented by many agricultural fields, Indiana bats move or “commute” along hedgerows and stream buffers to access foraging sites in forest patches. Indiana bats may use these edges as a way to avoid crossing large open areas, or it may be that they prefer to fly along forest edges because they harbor more insects. Forested riparian corridors are ideal habitats for night-flying Indiana bats, as these will generally have the low clutter characteristics of a mature forest, provide an edge for commuting or foraging, and yield a diverse prey base as insects emerge from or are drawn to the water’s surface.

As with roosts, Indiana bats tend to be faithful to foraging areas. Individual bats forage in the same specific areas night after night or year after year, and colonies tend to forage in the same overall areas within and between years.

How might timber management impact Indiana bats

Because Indiana bats rely on large dead trees as maternity roost sites, timber harvests have great potential for either positive or negative effects roosting habitat for this species. If harvests take place while bats are using trees as roosts, then bats may be evicted, injured, or killed as a result of tree removal. While there have



*Primary maternity roost trees used by Indiana bats (*Myotis sodalis*) in central Indiana, by Zach Kaiser*

been no planned experiments measuring the response of Indiana bats to timber harvest during the maternity season, in at least 3 known cases, occupied roost trees have been unwittingly felled during the summer and adult and juvenile Indiana bats have been killed or injured as a result. In addition, a maternity colony of Indiana bats in Missouri abandoned one of its primary roost trees when a bulldozer was used to clear away some nearby brush. In North Carolina, a population of northern long-eared bats (*Myotis septentrionalis*, which is a closely related species) continued to use an active timber harvest area when small buffers (~30 feet) of live trees were left surrounding their roosts. However, we do not know if Indiana bats will behave in the same manner as northern long-eared bats during an active harvest.

During large-scale timber removal, existing snags may be damaged such that roosting potential is diminished (but snags may also be created, as described below). In addition, snags may shift quickly to being unsuitable following harvest; snags left standing away from the

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Bats in Your Woods (cont'd from page 7)

protection of live trees are more susceptible to losing bark or snapping off in high winds and may be less suitable as roosts if they are too exposed to sun, wind, and rain. During timber harvests, retaining patches of snags buffered by live trees may help to maintain Indiana bat populations over the long-term.

Areas that have a wide variety of forest types and age classes will provide Indiana bats and other bat species with suitable foraging and roosting habitat. Ideally, harvested areas should still hold dense patches of large trees such as cottonwoods, oaks, and hickories that have the potential to become suitable maternity roost trees/ snags in the future. For example, carefully planned two-age cuts with reserves of live trees could retain patches of live and dead trees with roost potential and also create desirable edge foraging habitat. Clearcutting “overmature” timber takes out trees that, with old age, would otherwise have the potential to become suitable roosts for Indiana bats. On the other hand, there may be a positive effect on the future availability of Indiana bat roosts if silvicultural practices like single-tree selection are effective in “releasing” residual trees so those trees are able to realize their full size potential and, ultimately, die.

In addition to carefully planned harvests, other activities that may produce suitable habitat for Indiana bats include prescribed burning, installation of ponds and ephemeral wetlands, and maintenance of narrow trails or roads through forests. Snag creation may occur via prescribed fires or as a result of damage during harvests, or through the more active method of girdling or injecting live trees with herbicides. Indiana bat populations are likely to benefit from snag creation only when snags are not common in mature forests. Male Indiana bats in Missouri use snags created by girdling, but we need more information to determine if such manipulative strategies are effective and when they are warranted. Buffers of mature trees left in riparian areas should provide suitable habitat for bats and reduce soil erosion, thereby improving local water quality and the quality of the available prey base. Connectivity among habitats is also important; for example, it is important to connect suitable roost habitat with quality foraging areas and to maintain travel corridors among potential roosting and foraging areas.

When suitable habitat remains, Indiana bats will be faithful to the same sites year after year. Thus, for all



*A corridor where Indiana bats (*Myotis sodalis*) hunt for insect prey during the summer, by Scott Bergeson*

types of timber management, it is important to maintain a component of mature forest during any transitional stages. Evidence from across the species' range suggests that Indiana bats are adaptable in terms of the species of trees and the types of woods they will use, but they must have an ongoing supply of large snags for roosts and surrounding forested habitat within which to forage. Without these, it is likely that a colony will abandon an area or forgo reproduction upon finding no suitable habitat in spring.

Forests are important to Indiana bats and, in Indiana, private woodland owners have an important role to play in maintaining suitable forested habitat for this species. With some creativity, a balanced approach, and long-term planning, management for timber can be compatible with management for viable Indiana bat populations in the Midwest and across the species' range.

Joy O'Keefe is an assistant professor in the Department of Biology at Indiana State University. Her research investigates the roosting and foraging ecology of forest bats, with a focus on the effects of active forest management on habitat selection.

Your Maples—Next on the Menu?

Annemarie Nagle

If you thought that emerald ash borer was bad news for your woods, just wait until you hear about its' bigger, hungrier cousin—Asian longhorned beetle.

Unfortunately you only have to go to Bethel, Ohio, a small rural community near Cincinnati and 40 miles from the Indiana state line, to find a forest that has been infested with this pest. The Asian longhorned beetle (ALB), an invasive wood-boring insect native to China and Korea, was discovered inflicting fatal damage on Bethel's trees in June of 2011. ALB is a federally regulated pest, and eradication is the goal whenever ALB is found.

Both the beetle's feeding damage and efforts to eradicate it have profound impacts on infested communities. To date, nearly 9,000 of Bethel's deciduous trees have met the saw and chipper. Sixty-one square miles remain under strict quarantine, limiting movement of potentially infested tree materials, while survey crews still struggle to gain a handle on how far the infestation has spread. Ohio is the fifth state to attempt eradication of this devastating tree killer, which has also been found in New York (Brooklyn, 1996), Illinois (Chicago, 1998), New Jersey (Jersey City, 2002), and Massachusetts (Worcester, 2007). Success is possible; ALB has been eradicated from Chicago, parts of New York and New Jersey, and several European countries.

Although the road to eradication can be long and expensive, the alternative—allowing ALB to spread beyond control—is far more costly. Unlike other exotic tree-killers like emerald ash borer, Dutch elm disease, and chestnut blight, which devastate a single host genus, ALB can kill 13 different tree genera. Here in the Midwest, that means about 60% of our forest canopy is at risk. If ALB were to spread out of control, it would threaten 19% of basal area nationally. In comparison, emerald ash borer threatens 3%.

ALB is also a major pest in its native China, where it has destroyed millions of elms, poplars, and willows in windbreaks and plantations. Many of these plantations produce poor-quality lumber used to construct crates and pallets, which in turn are used to ship goods (and resident ALB larvae and adults) around the world. Though international trade is typically responsible



ALB adults are large, shiny blue-black beetles with irregular white spots, and very long black and white striped antennae.

for initial ALB introductions, movement of infested branches and logs from killed trees can begin new, satellite infestations. If you bring firewood onto your property, buy local, USDA or Indiana certified wood. Certification ensures that the wood has been properly treated or seasoned to minimize presence of pests. Similarly, think twice about moving firewood from your own property, especially if source trees have died from an unknown cause.

Fortunately, ALB has yet to be found in Indiana. Because early detection of ALB infestations is key to the success of any eradication effort, you can help protect Indiana's forests by keeping your eyes peeled for the ALB and its' damage on trees in your town and on your property.

ALB Diagnostics

Look for ALB damage on *LIVING* trunks and branches of its preferred host trees: *Acer* (all maples), *Aesculus* (buckeyes and horsechestnuts), *Ulmus* (elms), *Salix* (willows), *Betula* (birches), *Platanus* (sycamores), *Populus* (poplars), *Albizia* (mimosa), *Cerciphyllum* (katsura), *Fraxinus* (ashes), *Koelreuteria* (goldenraintree), *Sorbus* (mountain ash), and *Celtis* (hackberry).

Holes or Round Pits in Tree Branches or Trunk

ALB creates very characteristic damage on the trunks and limbs of infested trees. During egg-laying, adult

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Your Maples—Next on the Menu? (cont'd from page 9)

females chew oblong bowl-shaped pits into the tree's bark. Egg-laying pits are typically about ½" diameter and weeping sap is sometimes present. Emergence holes are created when newly formed adults chew their way out from their larval home. These large, 3/8" to ½" holes (about the diameter of a #2 pencil) penetrate deep into the tree. Heavily infested trees are often riddled with egg-laying pits and emergence holes, and coarse sawdust may collect around the tree base or in branch crotches. Woodpeckers also create holes in infested trees to consume ALB larvae. Holes created by woodpecker feeding tend to be much wider than egg-laying pits, and extend deep into the wood of the tree.

Broken Branches with Large Larvae

The juvenile, or larval stage of ALB packs the tree-killing punch. Larvae are legless off-white grubs that may be visible in freshly cut wood. After hatching just beneath the bark, larvae feed only briefly on the tree's nutrient-conducting tissue. Most feeding is in the structural wood of infested trees, creating ½" wide tunnels until the heartwood resembles Swiss cheese. The relatively minor damage to the tree's vascular system allows it to stay green and appear healthy, making canopy dieback an unreliable diagnostic. Undetected infestations are extremely dangerous because they can fill the canopy with healthy-looking but structurally unsound limbs, which often snap off during storms and wind events.

Large Black and White Adult Beetles

All U.S. infestations have been identified by alert citizens reporting these unique and conspicuous beetles. ALB adults are large (1-1 ½" long) shiny black beetles with irregular white spots on their backs, sometimes with blue tinged feet. They are named for their long, black and white striped antennae, which exceed the length of their bodies. Beetles begin emerging from infested trees in late May, and continue through October. Adults are capable of flight, but typically do not move far from their parent tree, tending to re-infest it until the tree is dead.

Think You've Found ALB? Report It!

Never assume invasive pests are "somewhere else." If you see any beetle that looks like ALB or any signs that resemble ALB damage, take a photo and send to Indiana



Egg-laying pits and adult emergence holes on a heavily infested maple tree near Bethel, OH. Despite the damage, the tree had a healthy canopy.

DNR Division of Entomology and Plant Pathology at DEPP@dnr.in.gov. Capture and hold onto the insect for identification if you can. You can also call DNR's Invasive Species Hotline at 1-866-NO EXOTIC (1-866-663-9684). To learn more about signs and symptoms visit www.beetlebusters.info.

Annemarie Nagle is the Forest Pest Outreach Coordinator in the Dept. of Entomology at Purdue University. Ph: (765) 494-0822, naglea@purdue.edu.

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Conserving Federally Endangered Indiana Bats on Private Woodlands

By Scott Pruitt and Andy King

Hoosiers who manage woodlands are probably aware that their lands support a wide variety of wildlife species. What they might not know is that their woodlands likely harbor bats, and that bats play a critical role in keeping woodlands – and farm fields – healthy and productive. Indiana is home to a number of bat species, including the federally endangered Indiana bat. What does it mean to woodland owners that a federally listed species may be present? Well, it may surprise some that it's possible to manage woodlands for timber production and at the same time, conserve an endangered species.

The Indiana bat (*Myotis sodalis*) was one of the original species to be listed as federally endangered under the Endangered Species Act of 1973. Although the species occurs in 22 different states in the eastern United States, it became the Hoosier state's namesake bat in 1928 when it was first identified as a unique species based on a specimen from Wyandotte Cave in Crawford County, Indiana. Once numbering in the millions, Indiana bat populations have dropped steadily due to human disturbance and vandalism at winter hibernacula (caves and mines where they hibernate), deforestation, stream channelization, pesticide use and cave commercialization. Significant population increases occurred in the early and mid-2000s in Indiana and elsewhere, but these hard-fought gains appear to be quickly eroding due to unprecedented bat mortality rates associated with the fungal disease known as white-nose syndrome. White-nose syndrome has killed more than 5.7 million bats in the Northeast and Midwest since it was discovered in 2006.

But, why would woodland managers care about bats? It's economics. Bats are voracious predators of

night-flying insects, including many crop and forest pests, making bats very important to agriculture and natural ecosystems. Pest-control services provided by insect-eating bats in the United States likely save the U.S. agricultural industry at least \$3 billion a year, and that's just savings to farmers. In addition is the incalculable value to forests from insect-eating bats. Insectivorous bats are among the most overlooked economically important, non-domesticated animals in North America.

Bats in general, including federally endangered Indiana bats, clearly have enormous potential to influence the economics and health of agricultural crops and forests. And Indiana is an Indiana bat stronghold. A 2011 survey found the caves and surrounding forest habitat in south-central Indiana support over half of the species' range wide winter population, so maintaining high-quality summer and winter habitat in Indiana is essential to the Indiana bat's long-term recovery and will benefit our farms and forests in the process.

The goal for the Indiana bat, as for any federally listed species, is to recover the species so that it can survive without the protection of the Endangered Species Act. The US Fish and Wildlife Service's (Service) Bloomington Field Office has the national lead for Indiana bat recovery efforts and is also responsible for administering the ESA within the State of Indiana. The Bloomington Office routinely works with federal and state agencies, non-government organizations and private landowners to help them comply with the Endangered Species

cont'd on page 12



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Conserving Indiana Bats (cont'd from page 11)

Act by avoiding and minimizing incidental take^{1,2} of Indiana bats and by taking steps that will help recover the species.

For many woodland managers, who have no known Indiana bats on their property, complying with the ESA is not an issue. For others who know or suspect they have Indiana bats, the Bloomington Office can help the manager avoid incidental take of Indiana bats whenever possible, minimize adverse effects of timber harvest on Indiana bats, and even give advice for interested landowners to take steps toward recovery of the species.

Over 10 years ago, the Bloomington Field Office (BFO) developed guidelines to help federal land managers to avoid accidental/incidental take of Indiana bats during their forest management activities and to ensure compliance with the ESA. Although numerous tweaks have been made to these guidelines as new information became available over the years, the primary goals of the *BFO Forest Management Guidelines* remain the same: to avoid the potential for accidentally killing/taking roosting bats and to ensure a continual supply of suitable roost trees/snags and foraging habitat remain across the landscape.

In a nutshell, the BFO Forest Management Guidelines require the following:

- Maintaining 60 percent of canopy cover after timber harvests
- No harvest or TSI (timber stand improvement) removal of shagbark hickories, unless this species' density exceeds 16 per acre.
- Not felling/removing standing snags (except where they pose a human safety hazard) (i.e., the goal is to let them fall naturally so they can be used as roost trees as long as possible
- Do not harvest all of the large trees, but leave at least a small number of the largest trees on every acre and allow those same trees to grow old and die. When present, those trees should be from the species listed below, which Indiana bats are known to use in Indiana:

shagbark hickory	green ash	white oak
shellbark hickory	white ash	slippery elm
bitternut hickory	silver maple	northern red oak
American elm	black locust	sugar maple
post oak	eastern cottonwood	

- No timber harvest within 100 feet of a perennial stream or within 50 feet of an intermittent stream (as designated on a USGS 7.5-min quadrangle map).
- No felling of trees/snags >3" dbh while Indiana bats may be present from 1 April through 30 September (i.e., trees may be felled from 1 October through 31 March).

Adherence to these guidelines will avoid incidental take of Indiana bats and result in forest habitat that is suitable for the species' use, although it may or may not result in optimal habitat, which may require more intensive management practices.

Do these federal forest management guidelines apply to private woodland owners in Indiana too? Yes, if Indiana bats are known to be present. However, we know where the species occurs in Indiana only where biologists have previously conducted surveys, and most surveys for Indiana bats have been on public lands. The Service does not require private landowners to conduct surveys for federally endangered species on their lands and nor do we require our guidelines to be followed on lands where no records are known. If you know Indiana bats are present on your property, you should contact the Service for help in managing your woodlot in compliance with ESA. Even if you don't know Indiana bats are present, and you are interested in bat conservation, consider incorporating our guidelines in your timber management plans.

What if you know you have Indiana bats on your property but are unable to follow the Forest Management Guidelines fully? In that case, landowners are encouraged to contact the Bloomington Field Office (see contact information below) to discuss alternative processes. In some cases, the Service can issue an Incidental Take Permit (ITP) to a non-federal land owner that allows a specified amount of incidental take of a listed species. This provision of the Endangered Species Act provides some flexibility for activities such as timber harvests in exchange for conservation measures spelled out in a Habitat Conservation Plan (HCP). For example, the Indiana DNR, Division of Forestry is pursuing an ITP and is preparing an HCP with the Service which would allow more management flexibility on state forest lands that have Indiana bats. The Service has provided the Division of Forestry with funds to help them prepare this HCP. Again, an ITP/HCP is not needed where Indiana bats are known to occur and the BFO Forest Management Guidelines are being followed.

Conserving Indiana Bats (cont'd from page 12)

To receive a copy of the BFO Forest Management Guidelines or to discuss questions you may have regarding Indiana bats, forest management practices or ESA compliance issues in Indiana, please email Scott Pruitt (scott_pruitt@fws.gov) or Andy King (andrew_king@fws.gov) or call us at the Bloomington Field Office at 812-334-4261.

Scott Pruitt is the Field Supervisor of the U.S. Fish and Wildlife Service's Bloomington Field Office. Andy King is a Fish and Wildlife Biologist with the U.S. Fish and Wildlife Service.

Recommended Resources:

The Indiana bat:

<http://www.fws.gov/midwest/Endangered/mammals/inba/index.html>

http://www.fws.gov/midwest/Endangered/mammals/inba/inba_drftrecpln16ap07.html

Endangered species issues on private lands and HCPs:

<http://www.fws.gov/endangered/what-we-do/hcp-overview.html>

White-Nose Syndrome:

<http://whitenosesyndrome.org/>

Economic importance of bats:

<http://www.fort.usgs.gov/Products/Publications/23069a/23069a.pdf>

1 "Incidental take" – Take that results from, but is not the purpose of, carrying out an otherwise lawful activity

2 "take" is defined by the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or to attempt to engage in any such conduct. The term "harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding or sheltering. [NOTE: Take of federally listed species is prohibited by Section 9 of the ESA regardless of whether the taking occurs on federal, state, or privately owned lands]

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Conservation Go Point

By Chris Gonso

2013 will see a new effort by the Indiana Department of Natural Resources, Division of Forestry to reach out to the state's woodland owners and connect them information concerning protecting and managing their forest. As a woodland owner, you may be contacted as part of this initiative, which is funded in part by the US Forest Service, Northeastern Area.

Using assembled county geospatial and tax payer data, forested parcels larger than 10 acres will be matched with unique mailing addresses and sent a postcard briefly describing conservation funding and tax incentives that are available as well as announcing a forest alert system that landowners will have the option to sign up for online. The postcard will direct landowners to the "Conservation Go Point" web page hosted by the DNR.

On the Conservation Go Point website landowners will be invited to share their email address and receive information according to their interests and customized to their acreage location, forest type, and other spatial attributes. This will enable 'DNR Resource Alerts' to be sent to landowners if there is an immediate danger to their forest resource, like a neighboring landowner who has the invasive plant kudzu, a nearby outbreak of Asian long-horned beetle, or a combination of severe drought pocket and dangerous forest type for wildfire. It will also allow for highly targeted announcement of field days and workshops and improve awareness of grant funding eligibility based on a parcel's attributes.

It is estimated that Conservation Go Point postcards will be sent to 60,000 forest landowners that aren't already a part of the Indiana Classified Forest & Wildlands system. As such, there is tremendous opportunity to make gains statewide in the protection and conservation of Indiana's forests. It is hoped that this effort will help to bridge the gap that currently exists between many landowners and the varied and successful conservation and forest management programs that exist and help keep our forests working and providing the benefits we desire.

Chris Gonso is an Ecosystem Services Specialist with the Indiana Division of Forestry. Chris works toward developing landowners' abilities to receive payment for ecosystem services like carbon sequestration, water quality and biological diversity. In addition to these duties, he has worked with statewide forest planning, grants and alternative funding sources.

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Ask the Steward

By Dan Ernst



Question:

Full moons have always fascinated me. What full moons are coming up this spring?

Answer:

Full moons have marked the seasons throughout the ages and names of full moons vary by region of the world and cultures. In the Midwest names are commonly those given by Native Americans and later on by European settlers. Upcoming spring moons are the Worm moon on March 27th to usher in the softening ground, earthworm emergence and return of spring birds feeding on them. It's also known as the Sap moon referring to spring sap flow and maple syrup season.

On April 25th the Egg moon or Sprouting Grass moon shines and brings the season of new grass, early flowers and egg laying in the new year's nests.

May 25th will bring the Flower moon also known as the Corn moon or Milk moon. April showers bring May flowers. Corn planting season is well underway- or nearly done on today's farms.

Perhaps most anticipated will be on June 23rd when the moon reaches perigee (its closet visit to Earth in 2013 at 221,824 miles). This moon, known as the Strawberry moon will be the largest full moon of the year

and will appear to be 14 percent larger and 30 percent brighter than the smallest full moon. It's prime strawberry season too.

Question:

How do moon phases differ from full moons?

Answer:

Moon phases references the percent of illumination visible on the face of the moon as the earth and moon orbit the sun together. The Full Moon is one of 8 major named phases of the moon. At this phase the moon is 180 degrees away from the sun and earth and has almost full illumination by the sun. If in full alignment the earth blocks all or part of the sun's rays causing a lunar eclipse as the earth's shadow crosses the face of the moon. Some claim that fishing is best during the full moon phase.

Other phases include the New Moon when the moon is between the Earth and sun and is illuminated by the sun's reflection off the Earth, appearing like a dimly lit full moon. If the moon is directly in line with the sun a solar eclipse occurs.

Waning moon phases (crescent and gibbous) refer to periods when decreasing amounts of the moon are illuminated by sunlight. Some gardeners take moon phases very seriously and avoid planting seeds

during a waning moon phase- except for root crops.

Waxing phases (crescent and gibbous) are periods when increasing amounts of the moon are illuminated by sunlight.

1st Quarter moons are 90 degrees away from the sun in the sky and half-illuminated when viewed from Earth. At this point the moon has traveled about a quarter of the way around Earth since the new moon.

Last quarter moons have moved three quarters of the way around Earth and the other half of the visible face of the moon is illuminated when compared to the 1st quarter moon.

In addition to anglers and gardeners, moon phases are also looked to for optimal times for deer hunting, tree pruning, cutting hair, weddings and a surprising list of other things. Does it work for morel mushroom hunting?

Dan Ernst is an Assistant State Forester with the Indiana Division of Forestry. He oversees the state forests in Indiana and has authored the "Ask the Steward" column for years. Have a question for the column? Email Dan at dernst@dnr.in.gov.

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Days Gone By



Photos of Albert James Halton “logging out space” for Lieber State Park in Owen County circa 1940. Mr. Halton owned a saw mill west of Spencer.

Photos courtesy of Deanna Collins.

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