

FALL 2002

## NC's Insect SWAT Team Responds to Latest Forest Threat: Emerald Ash Borer

The Station's insect research team in East Lansing doesn't have to go far to hunt down the latest exotic villain in a woeful new story of tree decline and death: the emerald ash borer has settled in southeastern Michigan, just an hour or two away. This metallic green beetle, first identified 3 months ago, has infested tens of thousands of ash trees along streets and in woodlots within a six-county area in Michigan and one county in neighboring Ontario. The borer's target tree—ashes of all ages, healthy or stressed—makes up 5 to 20 percent of the street trees in many Midwestern cities, planted in many of the areas left bare by Dutch elm disease.

According to insect team leader Bob Haack, the emerald ash borer could potentially spread throughout the range of ash in North America and cause considerable economic and environmental damage. So far, it has successfully attacked all native species of ash growing in the infested counties of Michigan and Ontario. Infested trees die within 1 to 3 years. "All the beetle has to do is lay its eggs on an ash tree and the larvae will take care of the rest," Haack said. "And the adults appear to be strong fliers, which means they can spread rapidly. Judging by the number of infested trees threatened with removal," he said, "the emerald ash borer is spreading and killing trees faster than the Asian longhorned beetle ever did."



David Roberts

*Green ash killed by emerald ash borer serpentine larval galleries.*

Currently, the only effective way to control the emerald ash borer is to remove and destroy infested trees. But as the borer continues its attack, Bob *continued on page 5*



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### In The News

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- **Indiana Bats**
- **New Wildlife-Habitat Book**



Paul Gobster

## Putting a Human Face on Restoration: An Award-Winning Book Sheds Light on Chicago Controversy

Chicagoans have been involved in restoration since the late 1970s, when public agencies and volunteer organizations began working to re-establish tallgrass prairie, oak savanna, and other native ecosystems within the county forest preserves. Their learning curve was steep, especially when it came to the social aspects. In 1996, public concerns led policymakers to put a temporary moratorium on restoration activity in two counties.

As Paul Gobster, research social scientist with NC's Natural Resources for Urban Populations unit in Chicago, notes, "While restorationists had developed nearly two decades of experience dealing with technical aspects of restoration, they were much less prepared for dealing with issues involving people and politics."

Intrigued by the opposition to what most restorationists considered an altruistic activity to save nature, Gobster and his colleagues began studying several Midwestern restoration efforts.

In hopes of sharing the lessons they learned with other restoration groups, Gobster collaborated with Bruce Hull,

professor of forestry at Virginia Tech, to edit a book entitled *Restoring Nature: Perspectives from the Social Sciences and Humanities*. It has garnered favorable reviews in numerous journals and won awards last year from the American Society of Landscape Architects and the Society for Ecological Restoration.

"We found that while most people were favorable toward the general idea of restoration, some objected to particular practices such as tree removal and herbicide application," said Gobster. The results suggest that "there needs to be room for negotiation, even among people who share a desire to see nature preserved."

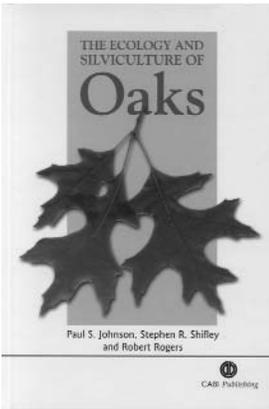
### Restoring native prairies and community ties

Gobster, Hull, and others from *Restoring Nature* are now studying how conservation efforts may build community capacity. The team wants to identify what makes a project successful, or in Hull's words, "how groups can get restoration off the drawing tables and out of the courts and implemented effectively on the ground." They'll publish the results in a second, more hands-on book about restoration. 🌳

**Restoring Nature, Paul Gobster's and Bruce Hull's book exploring the social aspects of restoration, won the Society for Ecological Restoration's Communication Award.**



*In 1996, Chicago's volunteer-based restoration of prairies and oak savannas was halted due to public controversy, proving that restoration is a social as well as technical activity.*



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## Definitive Reference on Ecology and Silviculture of Oaks

Oak trees are entrenched in our cultural heritage and folklore, an American symbol of strength and endurance that rivals the bald eagle in its stature. They also represent about \$3 billion a year in a harvest that finds its way primarily to furniture and flooring.

Despite the tree's history and significance, the silviculturist interested in learning the complexities of oak management has been forced to turn to various journal articles and obscure conference proceedings. To rectify that, Paul Johnson, the retired master silviculturist at the North Central Research Station (Columbia, MO), collaborated with Stephen Shifley and Robert Rogers to write *The Ecology and Silviculture of Oaks*, published in March 2002 by CABI Publishing. "I guess you'd say that from a silvicultural point of view, our book is really the first one to comprehensively deal with the subject of oak forests," Johnson says, adding that the book's emphasis on ecology also makes it different from most books on silviculture.

### What's now known, in one place

"There is this enormous body of literature on oak ecology and silviculture, and it's scattered all over the library in various types of publications.... For many foresters and land managers, it's difficult first of all to find these things and secondly to read them all and synthesize them. That was the goal at the outset for writing the book, to bring together all this literature and compile it into a rather comprehensive synthesis," says Johnson. "That lack of synthesis has often led to the reinvention of the wheel when it comes to oak management and recovery", Johnson says. "When we went into the field to talk to foresters, many were unaware of the existence of a lot of this information."

The book begins by classifying oak ecosystems, describing ecosystems as they vary by region. The authors then delve into such topics as regeneration ecology, development of natural stands, and silvicultural methods for oak stands of different types. The book differentiates among various oak ecosystems because they vary widely in their response to management practices, often more so than other types of forests.

**Ecological aspects of regeneration** Oak regeneration is a hot topic in oak silviculture, in part because success has been uneven. "There has been some confusion and misdirected efforts on the part of forest managers largely because we haven't brought an understanding of ecology to the silviculture of oak forests. Sometimes they were trying to apply generalizations from (oak ecosystems in) another region that wouldn't be appropriate in their region. There are many different kinds of oak forests, and they all have a different regeneration ecology."

Despite the current economic importance of oaks—dominated by northern red oak and white oak—it is more important to consider restoration of oaks for their ecological value, says Luppold. "Over time the market has reacted to what is available. What I like about the oak is its ecological aspects. It's a food production tree (in the form of acorns and foliage)."

Add that to the tree's cultural significance, and there are plenty of reasons to regenerate America's oak stands. Johnson hopes his book will help that process along. 🌱

# Betting on Knowledge to Help Save a Bat Species

*Some species, including the Indiana bat, are difficult to catch with nets, so the team is also using acoustical devices that pick up the bats' unique echolocation signals.*

Public attitudes towards bats have transformed in recent years, as word has spread about the beneficial services bats perform. As our appreciation grows, so too does our concern about the endangered status of gray bats and Indiana bats.

An effort to protect both species' wintering caves has paid off in a recovery for the gray bat. But Indiana bat numbers have continued to decline, from about 500,000 in 1991 to about 300,000 today, according to Sybill Amelon, a wildlife biologist at NC's Central Hardwood Ecosystem unit in Columbia, MO.

Amelon became interested in the Indiana bat when she was writing biological impact statements on the Mark Twain National Forest in Missouri. "We would try to find the best scientific knowledge on local bats, and there was often nothing known. In particular, with the Indiana bat, you just could not find any supporting research to determine if forest management practices would impact their population," says Amelon.

Amelon decided to try to fill in those gaps. In particular, she hopes to gain a

better understanding of the home range, movements, and habitats used by several different species of eastern forest bats, and to translate that into management guidelines that could help maintain healthy populations of all species.

**Listening in on bats** Amelon and her coworkers combine two methods to track bat movements. The traditional method is to drape mist nets over waterways and flyways to capture the animals and attach very small radio transmitters to them. Some species, including the Indiana bat, are difficult to catch with nets, so the team is also using acoustical devices that pick up the bats' unique echolocation signals.

With both the acoustic and telemetry information, the team can map out the distinctive habitats and home ranges of different types of bats. They'd like to identify the characteristics of high quality roosting and foraging habitat for each species. So far, they've found that the northern long-eared bat, Indiana bat, and gray bat tend to stick to more heavily wooded habitat, whereas red bats and pipistrelle bats

*continued on page 5*



*Sybill Amelon is filling the gaps in our knowledge of ecologically important bat species.*

◆ *Number of trees infested by Asian longhorned beetle during the first year of surveying in New York City and Chicago: 1,000. Estimated number of trees infested by emerald ash borer in Michigan (surveys not yet complete): between 100,000 and 1,000,000.*

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Haack, other East Lansing entomologists, and cooperators are working hard to find other ways to contain it.

**To contain the borer, understand its natural history** Station entomologists, along with cooperators from Michigan State University and Michigan Tech University, have begun studies of the borer's seasonal development, within-tree distribution, survival in cut logs, natural enemies, and attractants. NC entomologists Haack, Greg Hobbs, Toby Petrice, and Therese Poland have spent several days in the Detroit area, injecting insecticides in infested trees, testing different products and delivery systems. Later, they will cut these trees down to determine which products were most effective. They have also spent many days felling infested trees, stripping the bark, and noting the position and number of the creamy-white borer larvae, as well as any natural enemies such as parasitic wasps and predatory beetles. Larvae that appear sick are being examined for fungal infections by NC entomologists Leah Bauer and Debbie Miller and cooperator Houping Liu. The hope is that natural enemies like wasps and fungi could serve as biological controls.



Andrew J. Storer

*Adult emerald ash borer.*

The emerald ash borer is a villain, all right, but NC's good guys are on the case, using the quick response strategies they perfected in the Asian longhorned beetle fight.

Also on the case is entomologist Steve Katovich, lead person in State and Private Forestry for the emerald ash borer. For more information, check out the S&PF's Web site: <http://www.na.fs.fed.us/spfo/eab/index.html>



*Indiana bats prefer heavily wooded habitats, while red bats and pipistrelles prefer the edges of forest openings.*

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prefer the edges of forest openings. Amelon says that these findings suggest that red bats or pipistrelle bats are well suited to adapt to management and other disturbances in their home ranges.

The results have practical importance for managers at the Mark Twain National Forest, according to Jody Eberly, a wildlife biologist on the Mark Twain. "We need to understand how the bats use national forest habitat so that we're not contributing to the decline of any species, but at the same time we're able to provide forest products," she says.

**The bat-human interface** One study is being conducted in an undeveloped area of the Mark Twain National Forest, while the other is in the interface between an urban and rural area. "We're comparing how the bats use habitats in areas that have lots of disturbance with how they use habitats in areas of low disturbance. If there isn't a difference, that's a strong indication that human disturbance in the summer habitat is not one of the problems associated with the (Indiana bat's) decline. It's kind of a process of elimination," Amelon says. It's a process she hopes will prevent another kind of elimination for one of our important bat species. 🌳



White-tailed deer.

“... this will be a landmark publication for teaching graduate students in forest wildlife research.”  
— Richard De Graaf.

## Building a Bridge Between Disciplines: Haight Edits Landmark Collection

Forestry and wildlife biology do not always share the same language, methods, or even goals. But Robert Haight, a research forester with NC’s Social and Economic Dimension of Ecosystem Management unit, believes the two fields have much to offer one another. In that spirit, Haight collaborated with Stephen DeStefano of the Massachusetts Cooperative Fish and Wildlife Research unit, University of Massachusetts, Amherst, to edit a collection of articles examining how wildlife populations respond to changing forest habitat. The papers went through the same review process as *Forest Science* papers do, and were published in May 2002 under the title: *Forest Wildlife-Habitat Relationships*.

The book includes an overview of forest wildlife-habitat relationships, how scale affects the assessment of wildlife habitat, and how wildlife responds to changes in vegetative cover and silvicultural treatments such as selective logging. Haight sees the book as a resource for foresters who want to learn more about issues in wildlife biology. “For example, we are just beginning to understand how major disturbance factors like roads affect wildlife populations such as migrating birds or salamanders.”

**Bringing wildlife back into the forest**  
Haight pursued the project to

encourage communication between the disciplines. “Most articles in *Forest Science* deal with biometrics, genetics, economics, and management, but not wildlife. One reason is that wildlife scientists tend to publish in wildlife-related professional journals. In addition, a primary goal of wildlife and conservation biology is protecting elements of biodiversity, and *Forest Science* is viewed as a journal that isn’t really sympathetic to that goal.”

Haight calls that “a bad rap” and he says that’s one of the main reasons he wanted to collect these articles. “We wanted to say that yes, forest management has many objectives, including the enhancement and protection of wildlife habitat and populations.” He’s hoping the effort will encourage wildlife scientists to continue to reach out to a forestry audience.

**Boning up on wildlife issues** Besides bridging disciplines, the book is seen as a seminal reference. “It is a really good compilation of frontier areas of wildlife habitat research, so foresters who want to know what’s going on will find it a good place to start,” says Richard De Graaf, project leader of the Wildlife Habitat Research unit at the Northeastern Research Station. “I suspect this will be a landmark publication for teaching graduate students in forest wildlife research.” 🌲



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