

Ancient Wood

Topped by an eroding stream bank, a large sycamore, leaves still green, slumps low over the water, nearly blocking the channel. Farther downstream, another fallen tree helps to create a pool that shelters a catfish. But this tree fell into the stream 12,000 years ago!

As long as trees have grown beside streams, they have succumbed to the action of floods and currents. Rushing water scours soil away from the roots, undercutting the trees until they eventually fall into the stream. Every year, stream currents gather together jumbles of tree trunks and branches. Some of this wood becomes buried in sediments, where it is preserved for centuries, or even millennia.

Ancient wood, wood that was formed in trees that lived thousands of years ago, was recently found in a Missouri stream by Steve Peterson, who farms in north Missouri, and his son, Doug. They noticed that the creek running through their farm was uncovering buried tree trunks as it chewed into a nearby field. Curious about where the trees came from, Doug contacted the Forestry Department at the University of Missouri-Columbia.

The wood being uncovered at the farm ranged from nearly whole oak trees to small, very soft elms. All looked unusually old. Some of the wood was buried under at least 15 feet of soil in the creek bank, some lay on sand bars, and some was buried in the main channel. A forestry professor, Richard Guyette, took wood samples for carbon-dating and tree-ring dating to determine their age.

Results from the lab confirmed that the wood was from trees that had grown thousands of years ago. This finding led Guyette and Professor Dan Dey to age wood samples from various Missouri streams. They found a white oak tree in Hinkson Creek, which flows through the city limits of Columbia, that was 4,425 years old. They determined that most of the larger streams in Missouri have wood that is more

than 2,000 years old. Some ancient wood can be found in most Missouri streams.

The tree species and genus of ancient wood can be identified by examining the cellular structure of the wood under a microscope. Guyette has identified ancient wood as having come from many tree species, including bur oak, swamp white oak, red oak, elm, black walnut, birch, willow and cottonwood.

Based on the wood samples, oaks apparently were common and widely distributed throughout Missouri bottomlands. In some cases, entire oaks were buried so quickly and preserved so thoroughly that the bark is still intact. Streams have not only buried whole trees but also portions of the forest floor. Ancient forest floor lit-



Jim Rathert

12,000 year old trees continue to stabilize stream banks and provide fish habitat.

Richard Guyette

Uncovered

by Daniel C. Dey, Richard Guyette, Michael Stambaugh



Erosion often uncovers ancient trees that have been preserved in soil. The oak log in this photo came from a tree that grew about 6,300 years ago. Ancient wood can readily be identified by deep fissures (left) in the log.

ter can be found sandwiched between layers of alluvial deposits. Twigs, leaves, acorn caps, hickory nuts and husks and walnuts are common in the buried litter.

One section of Medicine Creek in Putnam County yielded a fantastic find. Specimens of two coniferous tree genera, spruce (*Picea*) and fir (*Abies*), that dated to about 11,200 years before present. Today, boreal forests grow in the northern lake states and Canada, and are composed of species such as white and black spruce, white cedar, balsam fir, and jack pine. Shortly after the last glaciers retreated from the Midwest, boreal forests grew here, too. It is amazing that



Jim Rathert



Jim Rathert

Carbon-dating helps determine the approximate age of wood. Tree-ring analysis reveals weather and growing conditions during the life of the tree. Information gleaned from ancient wood helps researchers understand climate and habitat changes that have affected Missouri's forests over thousands of years.

trees from boreal forests are still present in Missouri, providing stream habitat and structure.

As the glaciers receded further north and temperatures warmed, eastern deciduous hardwoods began to define the composition of Missouri's forests. An oak of the white oak group, carbon-dated to about 13,000 years ago, is the oldest wood we have found at Medicine Creek. The finding suggests that temperate hardwood forest species were commingling with species from boreal forests between 11,000 and 13,000 years ago.

Streams and lakes are the best places to find ancient wood because the low oxygen levels of subterranean and aquatic environments inhibit wood decay. Logs lying on the ground, for example, decay somewhere between nine to 80 times faster than those deeply buried in waterlogged soil or submerged in water. We've found that the density of ancient oak wood is half the density of modern oak after about 6,500 years underground. In contrast, modern oak lying on the forest floor loses half of its density through decay in only 40 years.

The decay processes that act on ancient wood impart unique characteristics that can be used to help identify it.



Richard Guyette

A covering of water or soil retards the decomposition of ancient logs. This spruce, found on Medicine Creek in Putnam County, grew more than 11,000 years ago.

current, providing backwater areas and deep pools where fish can rest and feed.

Unlike modern wood, ancient wood often contains deep fissures that provide dragonflies and other invertebrates, crayfishes and leeches places where they can rest, feed and complete key stages in their life cycles. Portions of ancient logs and trees that rise above the water's surface are used for rest, refuge and travel by turtles, otters, beavers, muskrats, raccoons, and birds.

Ancient wood in Missouri streams can improve our understanding of historic conditions in bottomland forests, how these forests have changed over the millennia, and how trees and streams interact. Ancient oak in streams may lead to the development of oak tree-ring chronologies that can be used to model the productivity of bottomland forests and reconstruct climate over the past 12,000 years. Analyzing buried forest litter layers can reveal the composition and relative abundance of tree species in ancient bottomland forests. The age and mass of ancient wood can be used to understand the role that bottomland forests and rivers play in the global carbon balance and climate change.

Trees are such a natural part of stream communities that we often take them for granted as we canoe, fish, wade, and swim. The next time your canoe bumps up against a submerged log in the stream, or you cast your lure into a deep pool behind a fallen tree, think about how old that wood might be, how it came to rest there, and where it may be in a thousand years. The longevity of wood in Missouri streams help us better appreciate, understand and manage our forests and streams. ▲

Large logs of some ancient wood, usually more than 8,000 years old, are easily broken and fracture smoothly across the grain. Ancient wood can contain six times more water than wood and often has a sponge-like texture. The wood is heavy when wet, but after drying out, it is noticeably lighter than modern wood and often falls apart.

Subtle differences between the weathering of ancient and modern wood create, when dry, a distinctive pattern or texture on the wood surface. As it dries, ancient wood shrinks a lot more, both along the grain and across the grain, than young wood. As a result, dried ancient wood has a unique texture that resembles an alligator's back.

Color is sometimes helpful in identifying ancient wood. Oak logs turn black inside within a few hundred years of being buried in soil or submerged in water. Some ancient wood changes from light brown to black within seconds of being broken and exposed to the air. On the other hand, some black walnut wood retains its color even after 8,000 years of burial in sediments.

Like modern wood, ancient wood provides habitat for insects, fishes, mammals and other animals. Ancient trees and logs can also change the force and direction of stream

Age of Wood Collected From Missouri streams

Location	County	Age of wood
Lamine River	Cooper/Morgan	3,070
Mussel Fork Creek	Linn	2,580
Cedar Creek	Boone/Callaway	2,500
Medicine Creek	Putnam	11,950
Locust Creek	Sullivan	3,030
Hinkson Creek	Boone	4,425
Current River	Shannon	4,230
Fabius River	Scotland	2,339
Brushy Creek	Boone	514



Program Schedule

Television the way Nature intended!

- Branson** Vacation Channel / Fri., Sat. 8:30 p.m.
- Brentwood** Brentwood City TV / Check local listing for times
- Cape Girardeau** Charter Cable Ed. Ch. 23 / Thursdays 6:30 p.m.
- Caruthersville** Lions Club TV / Saturdays 9 a.m.
- Columbia** KOMU 8 / Sundays 11:00 a.m.
- Chillicothe** Chillicothe Cable TV / Mondays 7 p.m.
- Hannibal** KHQA / Weekends, check local listing for times
- Hillsboro** JCTV / Mondays 12 p.m. & 6 p.m.
- Independence** City 7 / Thurs. 2 p.m., Sat. 10 a.m. & Sundays 8 p.m.
- Jefferson City** JCTV / Tuesdays 5 p.m.
- Joplin** KOZJ / Saturdays 2 p.m.
- Joplin** KGCS / Sundays 6 p.m.
- Kansas City** KCPT / Sundays 9:30 a.m.
- Kansas City** Metro Sports / Tues. 5:00 p.m. & Sun. 7:00 p.m.
- Kirkville** KTVO / Sundays 11:30 a.m.
- Maryland Heights** AT&T A-2 Cable America 10 / daily 6 a.m. & 6 p.m.
- Mexico** Mex-TV / Tuesdays 7 p.m.
- Mountain View** MVTV / Thursdays 6:30 p.m.
- Noel** TTV / Fridays 4:30 p.m.
- O'Fallon** City of O'Fallon Cable / Wednesdays 6:30 p.m.
- Parkville** City of Parkville / First and third Tuesdays of the month 6:30 p.m.
- Perryville** PVTV / Mondays 6 p.m.
- Raymore** Govt. Access-Channel 7 / Check local listing for times
- Raytown** City of Raytown Cable / Wed. 10:00 a.m. & Saturdays 8:00 p.m.
- St. Charles** City of St. Charles Ch 12 / Tues. 5:30 p.m. and Wed. 10:30 a.m.
- St. Joseph** KQTV-Channel 2, Various, check listings
- St. Louis** KSDK-Channel 5 / Sundays 4:30 a.m.
- St. Louis** Charter Communications / Saturdays 10:30 a.m.
- St. Louis** City TV 10 / Mondays 11:30 a.m., Wednesdays 3:30 p.m.
- St. Louis** Cooperating School District / Wednesdays 9 a.m.
- St. Louis** DHTV-21 / Mondays 10:30 a.m., Saturdays 5:30 p.m.
- St. Louis** KPTN-LP/TV58 / Thursdays 8:00 p.m.
- St. Peters** City of St. Peters Cable / Check local listing for times
- Ste. Genevieve** Public TV / Fridays 1 p.m., 6 p.m. & 12 midnight
- Springfield** KOZK / Saturdays 2 p.m.
- Springfield** KBLE36 / Nine times a week, check local listing for times
- Union** TRCTV7 / Mondays 7 p.m.
- Warrensburg** KMOS / Sundays 6:30 p.m.
- West Plains** OCTV / Mondays 7 p.m.

Meet our Contributors



Dan Dey (left) is a USDA Forest Service research forester with 23 years in forest management and research. He and his wife, Mavis, and their children live in New Bloomfield. **Mike Stambaugh** (center) is a forest research specialist at the University of Missouri-Columbia. He is working on fire history and climate reconstructions using tree rings. He lives in Columbia with his wife, Amy, and daughter, Silvia. **Richard Guyette** is a research associate professor in forestry at the University of Missouri's School of Natural Resources. He studies tree rings to learn about forests, the environment, ecology and history. He lives with his wife and children in Central Missouri.

Vince Magers is a natural science writer in Kansas City. His work has appeared in many publications. He is an avid gardener and a member of the Kansas City chapter of the Missouri Native Plant Society.



Jack McLaughlin is a freelance writer who has been published in all of America's major sporting journals. He started tying flies when he was 15 years old and has been a member of the Ozark Flyfishers since 1973. He lives with his wife, Jane, near Mountain View.

Conservation Department silviculturist **Keith Moser** works in forestry research. He has been with the Department since the fall of 2000. Before that, he was the forestry research scientist for Tall Timbers Research Station in Tallahassee, Fla. Keith lives outside of Rocheport with his wife, Cynthia, and their sons, Gray and Lane.



Keith Sutton is editor of *Arkansas Wildlife*, and a freelance writer, photographer and lecturer specializing in hunting, fishing, nature and conservation issues. He has authored or co-authored 22 books, including his latest, "Hunting Arkansas."

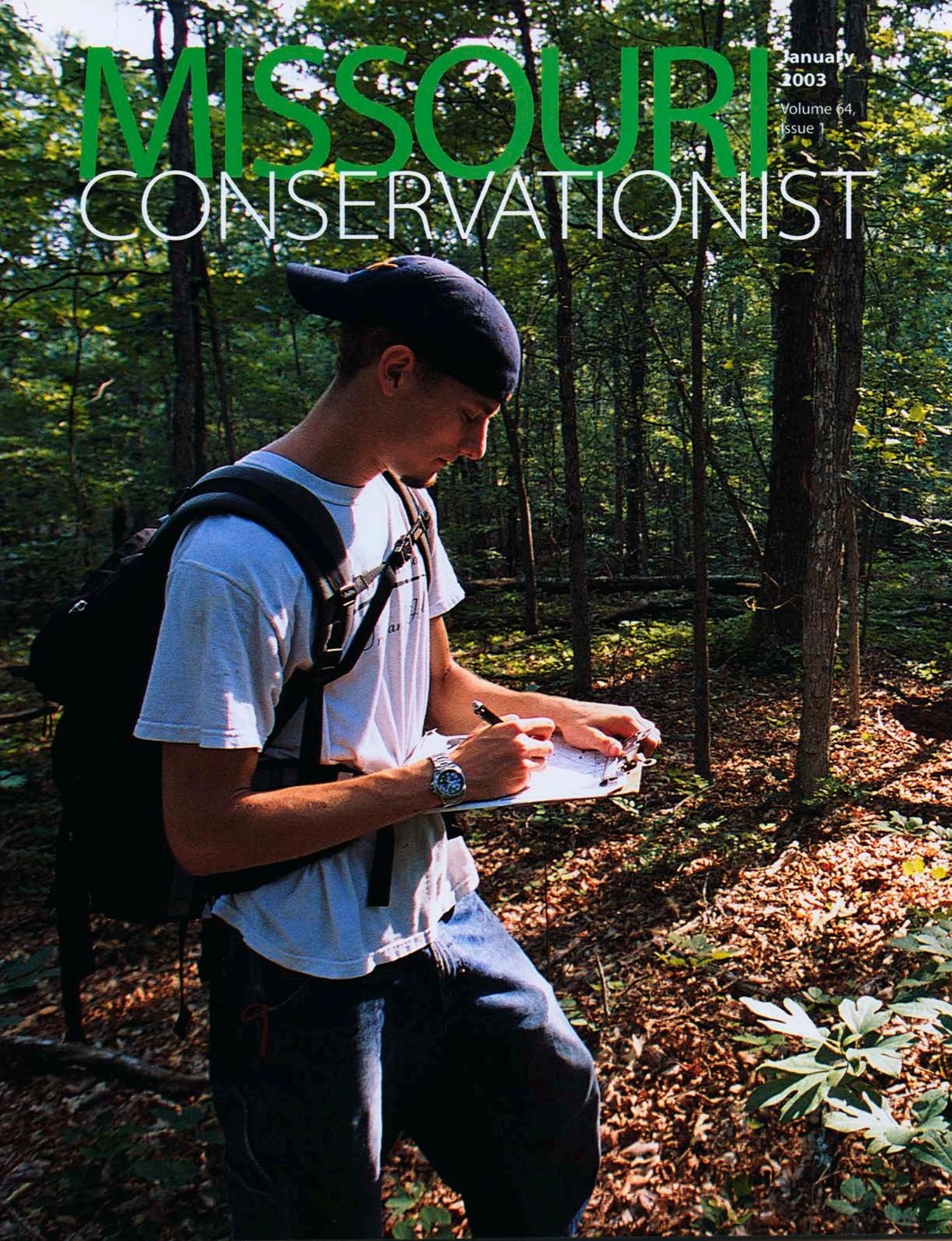


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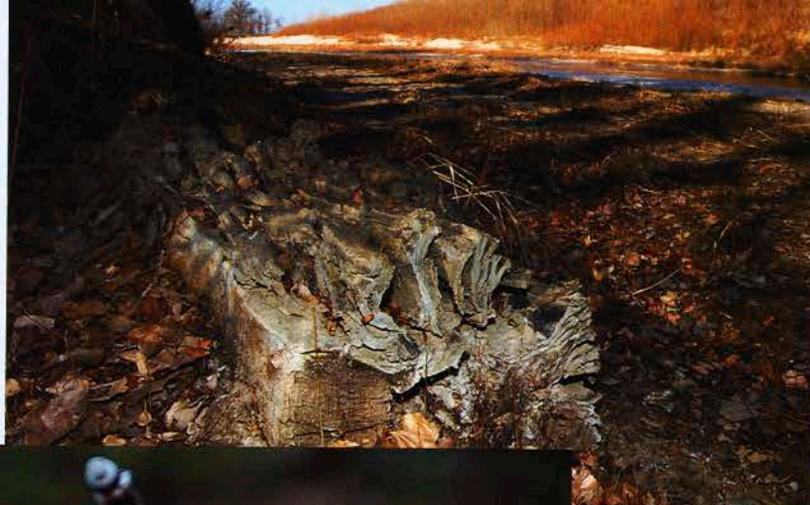
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MOFEP student researcher photographed by Cliff White

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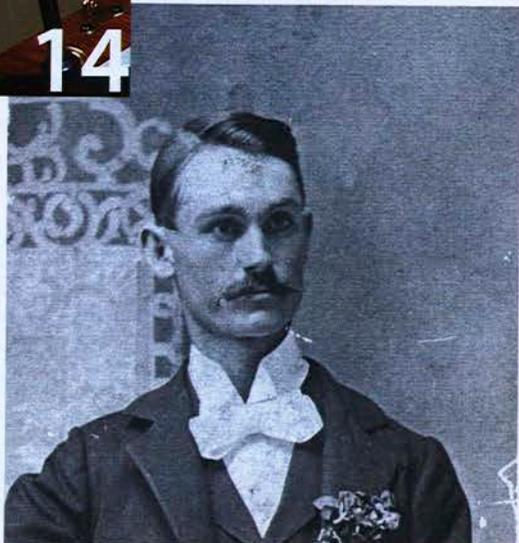
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