

On May 8, 2009, a windstorm of unprecedented fury swept across Ozark forests in southern Missouri, toppling millions of trees and leaving an imprint on the landscape for decades to come. The magnitude of forest damage was not immediately understood, and the impacts never were well publicized. Blown-down areas were so immense that loggers are still salvaging timber now, almost five years later.

DERECHO!

THE FORGOTTEN WINDSTORM THAT CHANGED THE OZARKS

When a blast of “odd wind” swept in, dislodging dead branches, John Kabrick and four colleagues abandoned their work at the U.S. Forest Service’s Sinkin Experimental Forest, scrambled into two trucks, and headed for a small clearing. For nearly an hour, the gale toppled trees

first in one direction, then in another, then another. They watched short-leaf pine succumb first, followed by hardwoods. Their parking spot became unsafe, but each place they moved was vulnerable. At one point, slamming a truck into reverse barely saved its hood from being crushed by a large oak.

“It was beyond fright,” said Kabrick, the forest’s supervisor, as he described the slow-motion horror scene that unfolded on May 8, 2009, in southern Dent County, Missouri. “There was a short time when I had no idea that we would actually get through it. It just seemed like a matter of time before trees would fall on us.” When the wind subsided, the two vehicles were trapped by hundreds of trees, and the group walked out.¹

That same morning, about 10 miles to the east in Reynolds County, landowner and ecologist Peter Becker’s meticulously managed forest of towering oaks came crashing to the ground. Fallen trees blocked his winding gravel driveway for a week, electricity was out for 15 days, and the scenery was devastated. Perhaps most crushing was the realization that nature had overruled his effort to set an example of sustainable harvesting.²

Veteran logger Larry May was working in the woods that day on a long, narrow ridge in northeast Shannon County, some 18 miles south of Becker’s place, when a tornado struck without warning. He did not even have time to jump into the cab of his

nearby log truck. He crawled under and desperately gripped the driveshaft, his eyes clenched against pelting dirt and debris. Three trees fell on the truck, pinning it to the ground. When he emerged, most of the forest was horizontal, making walking nearly impossible. To his amazement and relief, his son and a third logger had survived, clinging inside their logging skidder. Using chainsaws and a skidder, the three struggled through the maze, taking five hours to fight their way eight miles to the highway.³

The ferocious storm knocked down vast swaths of timber in a concentrated 17-mile-wide, 100-mile-long path across the southeastern Missouri Ozarks, but its bite was felt over a 24-hour period along a 1,000-mile ribbon that stretched from central Kansas through Illinois, Kentucky and Tennessee, then faded in Virginia and North Carolina. The National Weather Service reported sustained winds higher than 60 mph for most of its course, with many instances of 90 mph microbursts, and a few gusts over 100 mph. The long-lived, complicated storm system, called a *derecho*, spawned some 40 tornadoes, 23 of them in Missouri.⁴

This *derecho*’s effect on forest landowners and the forest industry in the Ozarks has gone virtually unnoticed. That story is explored here, with a focus on the coping strategies of three large forest landowners: Missouri Department of Conservation, Mark Twain National Forest, and Pioneer Forest.

BY DENISE HENDERSON VAUGHN



COURTESY OF JASON JENSEN

Tornado-toppled trees lie in the Logan Creek Conservation Area in western Reynolds County, photographed about a week after the storm by a resource forester with the Missouri Department of Conservation.

“SUPER DERECHO”

Derecho, a Spanish adjective that can mean “straight” or “direct,” originated in 1888 to describe a storm with direct winds, as opposed to a tornado (Spanish *tornar*, “to turn”).⁵ But the use of *derecho* as a weather term languished until researchers dusted it off in the 1980s and defined specific parameters: a derecho must exceed 250 miles in length with sustained, damaging winds of 58 mph or greater for four hours or longer. Scientists identified 377 storms in the United States between 1986 and 2003—or nearly 21 per year—that fit the criteria.⁶

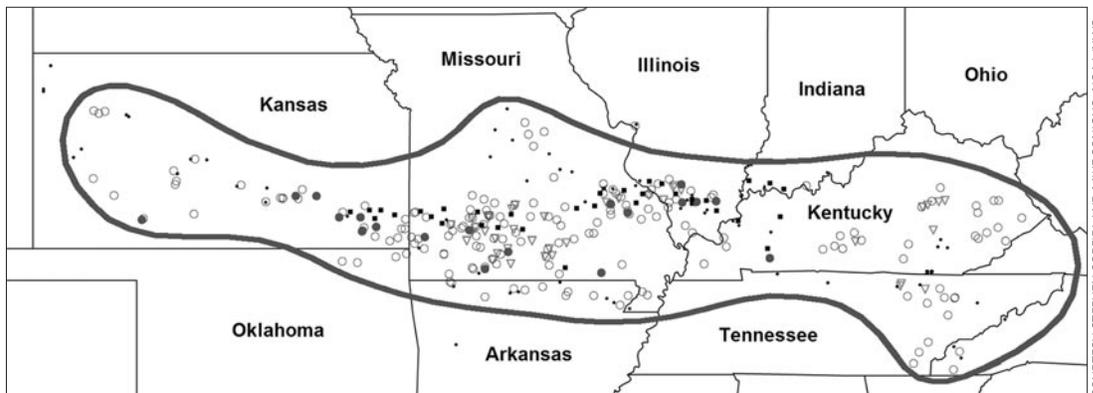
Historically, some derechos compete with tornadoes and

hurricanes in terms of loss of life and property. Between 1986 and 2000, derechos accounted for 153 deaths and 2,600 injuries—about half the number related to tornadoes and about two-thirds the number attributed to hurricanes. As for property damage, one derecho in 1998 accounted for \$432 million in losses paid by insurance companies.⁷

The May 8, 2009, derecho and its companion tornadoes caused plenty of damage over its thousand-mile span, particularly near urban areas. Seven people died in four states, and the National Weather Service reported many damaged structures and thousands without power for extended periods.⁸ The Missouri governor’s

The storm lasted about 24 hours and stretched about 1,000 miles from central Kansas through Illinois, Kentucky, and Tennessee, before petering out in Virginia and North Carolina.

- Large open circles = 58 mph wind
- Large filled circles = 74 mph wind
- Small filled circles = .75" hail
- Open triangles = tornadoes
- Filled squares = flash flooding



COURTESY STEPHEN CORFIDI AND MIKE CONIGLIO; NOAA/NWS



The shortleaf pine that fell near Bunker, Missouri, during the May 2009 derecho was still salvageable as of November 2009, when this was taken. Most pine was unusable within a year, but large oaks stayed viable for years and some are still being harvested

office assessed damage to public property and infrastructure at \$48.7 million.⁹ If the derecho had blown over more populated areas, the damage would have undoubtedly been in the hundreds of millions of dollars, with many more casualties.¹⁰

Even if there was relatively little financial loss, this storm was in fact unprecedented. Its meteorological characteristics included an area of intense low pressure of a sort never before documented in a derecho. That, plus its longevity and sustained high winds led Morris Weisman of the National Center for Atmospheric Research in Boulder, Colorado, to describe the event as a “super derecho.”¹¹ The nickname stuck, and the National Weather Service now refers to this storm as the Super Derecho. Meteorologists are not considering a new storm classification using that term, but to this day, no other derecho has exhibited that same structure or intensity.¹²

TREE MORTALITY AND ITS RIPPLE EFFECTS

In Missouri, some of the derecho system’s hardest blows fell on sparsely populated, heavily forested areas. People in its path, like John Kabrick and Larry May, marvel at the low incidence of injuries and structural damage. But timber mortality was extraordinary. Ground conditions played a role; soils were saturated from 11 inches of rain in about two months, with three inches in the previous two weeks,¹³ so root systems were vulnerable. In most places, leaves had fully emerged, acting like sails. The trees toppled like dominos.

Media reports did not emphasize or document forest damage, and the Super Derecho’s magnitude was not immediately understood. In July, the Missouri Department of Conservation (MDC)

estimated uprooted timber along the derecho’s path to total 204 million board feet, valued at \$12 million¹⁴—a low value, given that timber prices had fallen by more than half since before the 2008 recession.¹⁵

MDC’s calculations are conservative; true timber losses are probably much higher. MDC included only trees lost on lands identified as catastrophically damaged, rather than all impacted acreage. Records of actual timber salvage from the area’s three largest landowners amount to 109 million board feet. However, these three ownerships account for less than half the total acres identified as catastrophically damaged. Further, one of them, the U.S. Forest Service, only recovered about a third of its downed timber.¹⁶

Catastrophic damage was identified by change-detection software that compared satellite images recorded before and after the storm. More than 113,000 acres in southeast Missouri were thus categorized, most in the 100-mile swath across Dent, Shannon, Reynolds, Iron, Madison, and Bollinger counties. The computer analysis did not recognize areas where the canopy was not so disrupted to be obvious from a satellite. But those areas are widespread, and so the actual acreage affected is much greater than that identified as catastrophic.

Forest landowners report feeling grief and depression after the storm destroyed their scenic surroundings and many retirement nest eggs. They were overwhelmed with the logistical realities of removing piles of debris and attempting to retrieve and sell tumbled trees.

Peter Becker’s 120-acre farm overlooking the West Fork of the Black River was in the main path of the derecho. He had recently



COURTESY OF PETER BECKER

Landowner Peter Becker retained crop trees when he conducted an individual tree selection harvest in mid-2008. The forest in this photo, taken just after the logging, was later tipped over by the derecho. Becker's wife Marina Wong leans against a tree in the center.

conducted a harvest using selection cutting, as part of a controlled study published in a forestry journal.¹⁷ He and his colleagues had demonstrated the profitability to loggers and landowners of harvesting poor-quality, small-diameter timber along with sawlogs. The goal was to remove undesirable trees cost-effectively during the harvest and to leave the best trees to grow for later harvest and for regeneration.

Ultimately, Becker hoped to encourage this type of management regionwide as a substitute for the more common methods of clearcutting and high-grading.¹⁸ The carefully harvested forest was his legacy. "We had done something to improve its quality and that was a statement of our value system," he said. But the storm turned his forest into a de facto clearcut. "It was a huge disappointment," because in the end, the only statement was that "nature ultimately will rule," he said. A year later, a logger salvaged his magnificent, downed white oaks.¹⁹

Overall, landowners say they fared poorly. Timber prices were already depressed because of the recession, but the storm created a local glut, dropping prices even more. Loggers were overbooked. One owner said he felt lucky to find a logger who had a buyer for his furniture-grade trees, even though they were turned into railroad ties and charcoal.²⁰

Traditional financial safety nets offered only minimal help.

Farm insurance typically does not cover timber losses, and federal disaster assistance requirements are stringent. Timber owners discovered complicated requirements that prevented most of them from even claiming a casualty loss on their income taxes.²¹

Some landowners qualified for assistance through the Natural Resources Conservation Service (NRCS). In 2009, 50 landowners in 11 counties were allocated some \$525,000 in "storm damage forest rehabilitation funds" administered by NRCS for implementing conservation practices while conducting salvage harvests.²² Some also received conservation subsidies through the Farm Service Agency, which paid for removal of debris that posed a wildfire risk.²³

The local forest industry benefited from the windfall. Harvest of derecho blowdown lasted for several years because many fallen trees were partially rooted, prolonging their lives. Salvaging continues even now, but loggers' efficiency and productivity are hampered by dense new growth, degraded timber quality, dangerous dangling limbs, and fallen logs that impede skidders.²⁴

Nevertheless, the storm provided several years' employment at a time when the forest industry nationwide was at a low point. Sawmills in derecho territory stayed in business; one owner called the storm "a lifesaver" because the plentiful, cheap timber allowed area mills to undercut competitors.²⁵ But now that the salvage is winding down, these mill owners worry about availability of

standing timber. Thus, the long-term result of the storm was to create a natural boom and bust for the local forest industry.

BIG OWNERS, BIG CHALLENGES

Salvage logging after a natural disturbance is often controversial. People with economic interests typically want to recoup their investment and avoid waste while ecologists offer ample evidence that salvaging can interfere with ecosystem recovery.²⁶ After the derecho, however, even environmental activists who in previous years had appealed U.S. Forest Service timber sales did not object to salvage harvests. The fallen timber “would build a lot of homes and make a lot of flooring,” one said. “If it’s being used, then maybe some other trees that weren’t hit will stay standing longer.”²⁷

Even without interference, of the four owners who hold large tracts within the blowdown area in southern Missouri—Mark Twain National Forest, Missouri Department of Conservation, Pioneer Forest, and the Ozark National Scenic Riverways, operated by the National Park Service—the Forest Service was the last to take action.

The Park Service did not conduct salvage logging because of legal restrictions, but the agency did clear debris from about 22 miles of roads, plus campgrounds and other visitor areas.²⁸

Pioneer Forest’s aggressive strategy

The derecho hammered parts of Pioneer Forest. In the 1950s Leo Drey had purchased cutover Ozark forests on rocky, steep ground and established the enterprise that grew into Missouri’s largest private landholding.²⁹ Ever since, Drey and his foresters have doggedly practiced single-tree selection on Pioneer Forest’s 140,000 acres, gradually transforming the straggly trees into stands of immense oaks and shortleaf pines, nearly quadrupling volume per acre since the 1950s. Large tracts are now leased to the state for public recreation, particularly for backcountry hiking.³⁰

The storm seriously disrupted Pioneer Forest’s decades-long management plan. Foresters were dismayed to discover large patches of blowdown on 22,000 acres, with nearly 7,000 acres catastrophically damaged. Two punches hit their land: a tornado across the southern holdings, and to the north, the main derecho.

“We didn’t get to pick the trees,” said Terry Cunningham, then forest manager. Along the main derecho path, some of the worst damage affected the best trees, those on north-facing slopes. They fell with crowns pointing uphill, which Cunningham found peculiar considering that the storm had moved from west to east.

The destruction seemed overwhelming. “The clocks are ticking”—rot would quickly degrade the downed timber—“and the markets are bad. What are you going to do?” Cunningham said. The three staff foresters knew they would be competing with nearby state and federal agencies, but as a private enterprise, Pioneer Forest faced no legal hurdles, so they moved quickly. They secured extra loggers within days, jumping from six to 20 logging sales. To attract the mills, they dropped their stumpage price from \$200 per thousand board feet to \$125, and they streamlined their sales process, selling by weight rather than attempting to measure volumes with a timber cruise.

Before the storm, Ozark loggers typically were equipped to handle only eight- to 10-foot logs, a tradition that dates back to mule-logging days when sawmills were low-tech and labor intensive. Because the storm toppled and tangled trees of all sizes, loggers found that to extract high-value sawlogs, they had to also handle low-value trees, just to get them out of the way. Trees less

than 10 inches in diameter are typically marketed for paper or pallets and are sold in full-tree lengths. To recoup their labor, a number of loggers purchased tree-length trailers and thus expanded their services and products. The storm instigated a long-term policy change: Pioneer Forest now requires loggers to cut not just sawlogs but also tree-length pulpwood when harvesting standing timber.³¹

It took Pioneer Forest two and a half years, cutting only salvage, but nearly all fallen trees were retrieved. Salvaging yielded more than 30 million board feet, or 1.5 times the company’s typical annual target harvest for standing timber.³²

MDC salvages all its blowdown

The derecho system nearly flattened about 7,700 acres belonging to the Missouri Department of Conservation, which manages about 600,000 acres of forestland statewide.³³ Damage to state land was primarily caused by tornadoes, although small holdings in the main derecho path were also hit.

Despite the protocols required of a state agency, MDC foresters moved promptly and bid out more than 50 sales contracts. Like Pioneer Forest, they simplified sales, selling by weight rather than measuring board feet. The agency ended up salvaging on about 28,000 acres, producing close to 22 million board feet. Work started in July 2009 and was finished in December 2010.³⁴ A press release announcing completion touted the economic benefit to loggers and sawmills, and said the fallen timber was not subject to wildfire or decay.³⁵

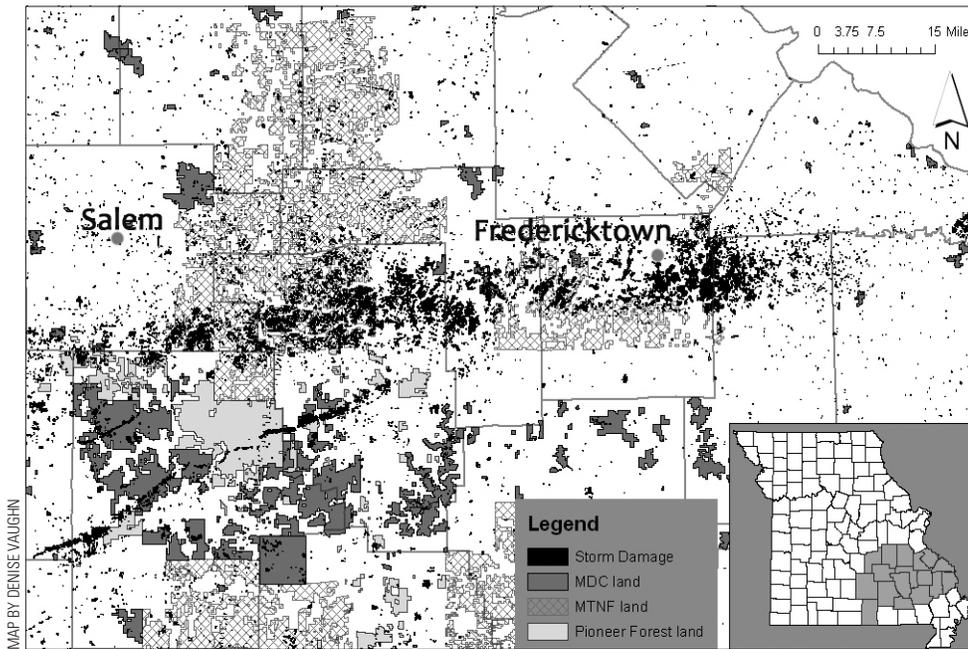
Some Ozark residents were critical of how the agency, which has goals that include helping landowners, focused primarily on its own land, leaving small, private forest owners to fend for themselves. But MDC officials say they did not turn away anyone requesting help, and their foresters provided technical assistance to applicants for NRCS storm damage funds.³⁶

MDC is authorized to set up an incident command system to help victims of tree-related disasters such as the 2011 Joplin tornado, but the system was not implemented following the derecho. “I don’t think we initially realized the magnitude of the storm and the scope of damage,” said State Forester Lisa Allen. With few deaths and little property damage other than trees, the derecho “went unnoticed. It didn’t make the headlines, even in Missouri,” she said. In hindsight, she said, MDC should have set up a state-level incident command.

Cumbersome process for the Forest Service

Of the big ownerships, the windstorm wreaked the most havoc on the Mark Twain National Forest, nearly all of it along the derecho’s main path. Within the 1.5 million acres of total landholding, 29,000 acres suffered catastrophic damage—quadruple the area on either Pioneer Forest or MDC land. Forest Service silviculturist John Bryan estimates that 80,000 to 90,000 acres had serious damage, most on the Salem Ranger District but also on the Fredericktown and Potosi districts.³⁷

The lack of media attention affected decision making. Dave Whittekiend, forest supervisor at that time, was unable to “sell the event” to the regional office in Milwaukee, to “convince them that this is a big deal and we need a lot of extra help.”³⁸ With piles of fallen limbs along roadsides obstructing the view, the extent of damage was not obvious at first. A month passed before Salem district staff could arrange an airplane flight for a view from above. Satellite images finally provided definitive evidence of the blow-



Catastrophic forest damage from the May 8, 2009, derecho affected three big landholdings: Missouri Department of Conservation, the Mark Twain National Forest, and Pioneer Forest. The main derecho winds traveled almost straight east. To the south, tornadoes sliced in a northeasterly direction. The chart below compares three owners' salvage operations.

DERECHO SALVAGE OPERATIONS FOR BIG OWNERSHIPS IN MISSOURI OZARKS

Landowner	Acres Owned in Missouri	Acres of Catastrophic Damage	Acres of Derecho Salvage	Board Feet Salvaged	Typical Annual Harvest	Time Spent	Percent of Blowdown Salvaged
U.S. Forest Service/ Mark Twain National Forest	1.5 million Acres	29,000 Acres	18,000 Acres So Far	57 Million Board Feet as of October 2013	45 Million Board Feet per Year	4+ Years and Still Working	Estimated 30–35%
Missouri Department of Conservation	600,000 Forested Acres of 789,000 Total Acres	7,700 Acres	28,000 Acres	22 Million Board Feet	16 Million Board Feet per Year (10-yr. Average)	18 Months	100%
Pioneer Forest	140,000 Acres	7,000 Acres	22,000 Acres	30 Million Board Feet	8 Million Board Feet per Year	2.5 Years	100%

down's scope. "My thoughts were, there's so much timber down, there's no way we're ever going to get it," said Salem District Ranger Thom Haines. Initially, opening blocked roads, securing public safety, and protecting against wildfires were among his priorities.³⁹

At times it may have seemed easier to cut through the fallen timber than the federal agency's red tape. On the Salem district, it took about a year to remove downed trees within 50 feet of the 180 miles of affected roads that adjoin Forest Service land. Creating that initial 100-foot fire break was accomplished by issuing forest product removal permits to loggers, rather than by executing timber harvest contracts, which must comply with the National Environmental Policy Act (NEPA), a complicated process that typically takes a full year.

Issuing timber salvage contracts began the second year, after the Salem district staff completed NEPA paperwork: documenting predicted impacts to wildlife, watersheds, community economics, cultural resources, and endangered species; issuing scoping doc-

uments; soliciting comments; and allowing time for appeals (none were filed). Except in two areas already slated for timber sales, the contracts restricted loggers to strips extending 300 feet on either side of the roads. Elements of the plan were intended to minimize environmental impact. Because roads typically traverse ridgetops, little salvage would take place on hillsides and in hollows, reducing the likelihood of soil erosion and removing the need to build logging roads. Facing less damage, Potosi and Fredericktown district foresters took a different approach, targeting pockets of blowdown timber. Most fallen timber on those two districts was harvested.

The Forest Service has no mechanism to provide financial aid for nonfire emergencies, so staffers were expected to cope with the additional timber sales using existing funding.⁴⁰ They also had to conduct cruises to estimate timber volumes because superiors at the regional level would not allow selling the fallen timber by weight. Their objections centered on accurately gauging its

volume and therefore its value. This frustrated Wittekiend, who said “the material didn’t have much value; it was a liability for us.” Further, during the time-consuming timber cruises employees were exposed to considerable risk while “crawling over and under that jackstrawed material.” Other than a modest waiver concerning cruise accuracy, Mark Twain staff did not receive any categorical exclusions or emergency waivers, so progress was slow.

Whittekiend recommends that the Forest Service establish a dedicated fund for nonfire forest disasters, such as wind, ice, or insects, so that damaged trees can be utilized. “Additional resources really make a difference. That’s why the Forest Service is so effective at fighting fires,” he said. And in future emergencies, Wittekiend said he would push hard for a weight-scaled method of selling damaged timber.⁴¹

The lengthy salvage process continues. As of this writing, loggers are still harvesting blowdown on the Salem district, but the timber is so degraded that it is no longer bid out.

Despite the impediments, Bryan estimates that on all three districts, the Forest Service has salvaged 18,000 acres so far. Probably a third of damaged trees have been retrieved, yielding an estimated 57 million board feet, plus some standing timber intermixed, for a total of 80 million board feet harvested from affected lands. Production per acre is high because “we lost our big, mature trees on some of the best, high-volume acres we had,” Bryan said. But even with this harvest, “the sad part is if you look, you can’t even tell we’ve done anything because it’s so big,” he said.⁴²

Loggers and mill owners grumble that “millions of dollars’ worth of timber is rotting in the forest.”⁴³ They criticize the red tape and slow pace, comparing the Forest Service unfavorably with MDC and Pioneer Forest. Haines responded, “We came on line last because our system is more cumbersome. Our lands are owned by 300 million other people. We have to address all their concerns.”

An unintentional benefit of the agency’s tardiness, Haines said, is that it provided a reprieve for private landowners because loggers were more available to the private sector early in the salvage. Additionally, salvage timber entered the market more steadily over the four years, a stabilizing factor that did not further depress the already low prices.

In the Salem district, a good percentage of the timber still lying in the woods beyond the ridgetop salvage areas is not expected to be harvested.⁴⁴ Thus, it could fuel a forest fire. The biggest wildfire on record for the Mark Twain, nearly 5,000 acres, ignited in November 2011 in blowdown timber.⁴⁵ Some areas only burned lightly, but others were hot enough to scorch standing timber. Bulldozers could not penetrate the snarled mass to build fire lines. Firefighters retreated to defend the roads, already cleared of fuel by the salvage operation. Later, during the extended drought in the summer of 2012, the Ozark region experienced summer wildfires for the first time in memory. One became a crown fire, unheard of in these forests. It was partly in blowdown timber.⁴⁶

Fear of fire is driving a new Forest Service plan to protect areas surrounding the town of Bunker. The project area is nearly 23,000 acres, of which about 9,300 acres will be designated as fuel breaks along ridgetops, where bulldozers will build fire lines and where down trees will be salvaged, chipped, cut small, or burned. About 18,000 acres are slated for prescribed burns, presumably in areas that cannot be easily reached for harvesting. The Forest Service expects to salvage another four million board feet of timber.⁴⁷

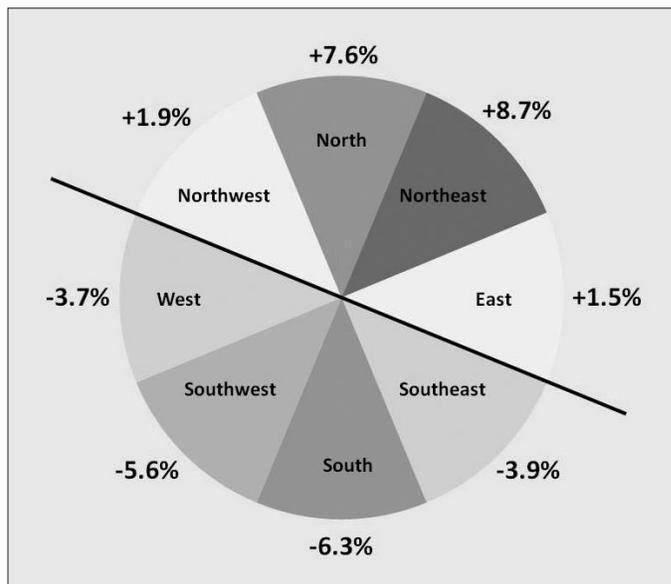


CHART BY DENISE VAUGHN

This chart shows the percent of damage on various slopes as compared to the landscape as a whole. Aspects (slope direction) are evenly distributed throughout in an eight-township study area, but the damage was more concentrated on north and northeasterly-facing slopes, and less so on southerly slopes. The axis dividing more damage and less damage runs from west-northwest to east-southeast.

CONFOUNDING DAMAGE PATTERN EXPLAINED

Even while derecho winds howled around him and he feared for his life, Sinkin Experimental Forest Supervisor John Kabrick managed to make scientific observations. Initially, when the pines were falling, winds blew west to east, he said, “and they almost appeared straight line. After about 15 minutes of that, the trees were blowing from north to south.” Eventually the hardwoods started to come down, too. “And after another 10 to 15 minutes, just before it ended, they seemed to be blowing from east to west,” he said.⁴⁸

When MDC Resource Forester Jason Jensen assessed damage from an airplane about a week after the storm, he was surprised to see trees lying in one direction on some hillsides but at a 90-degree angle to that on nearby hillsides.⁴⁹

Kabrick and Jensens’s descriptions do not support the idea of a derecho as consisting of straight-line winds. Further confusing matters are the anecdotal reports from foresters saying slopes facing in northerly directions sustained higher levels of timber damage.

These observations have been validated by a landscape-scale GIS analysis conducted by this writer. The analysis examined catastrophic timber damage by aspect (the direction a slope faces) in an eight-township study area, covering 288 square miles. Northern and northeastern aspects received 40 percent of all catastrophic storm damage, even though they represent only 24 percent of the overall landscape. Similarly, the southerly aspects had a good deal less damage than the landscape as a whole. Disproportionate damage to north-facing slopes only occurred along the main derecho path, not in areas hit by tornadoes, the GIS analysis showed.

Thus the air hurtling along the main derecho path could not have been mere straight-line winds. But what exactly happened? The Super Derecho complex developed a strong low-pressure

area well behind the storm's leading edge. It was so low, according to the National Weather Service, that "air had to rush in from behind to equalize the pressure difference."⁵⁰ This created winds stronger than 80 mph and lasting up to 20 or 30 minutes, which increased the storm's forward motion.⁵¹

These conditions contributed to the derecho's most extraordinary characteristic, described as a "mesoscale convective vortex," an unusually strong, long-lived, large-scale circulation. It "resembled the core of a tropical storm, complete with a small 'eye,'" leaving a "nearly continuous damage swath" that the National Weather Service called "unprecedented."⁵²

Weather scientists Mike Coniglio and Morris Weisman explained the timber damage pattern. Even though the system moved from west to east, "the damage was directly associated with that very tight, very intense circulation," said Coniglio. Within the rotating vortex, the strongest, most persistent, and most damaging winds were from northerly directions. They were on the back edge of the vortex, so when it whipped around, these winds delivered the second blow of a one-two punch—hence, the damage to north-facing slopes.⁵³

POST-DERECHO CONSEQUENCES

Tornadoes damage Ozark forests every year. But people who experienced the Super Derecho, like John Kabrick, Peter Becker, and Larry May, know this was no ordinary disaster. The storm is unmatched in regional memory for its degree of forest damage.⁵⁴ It created a timber management nightmare for landowners—big or small, government or private—who all competed for scarce loggers, and who overloaded sawmills with nearly unsellable timber during the height of the worst recession in decades. Local loggers and sawmills found reprieve from that recession in the form of inexpensive salvage timber, but the large influx set off a boom-and-bust economic cycle, leaving uncertain long-term prospects for the forest industry in the hardest-hit areas. New practices adopted to meet the storm's challenges have become institutionalized, changing the way some timber sellers and buyers do business.

Now, almost five years later, Ozark forests are recovering. The forest succession pattern born from the derecho is still in its infancy. Much of the fallen wood has been harvested or has decayed, but a combustible jumble still lies on thousands of acres. Whether this potential fuel sparks further forest damage is yet to be seen, but if ignited by wildfire, it could set off yet another successional stage.

Plot sampling conducted in a southern Illinois forest, both pre- and post-derecho, indicates that the May 2009 winds inflicted the heaviest losses to oaks, which had dominated the forest overstory prior to the storm. Researchers predict that succession will favor species that fared better in the storm, including hickory, sassafras, and sugar maple. This could shift the composition of species in the long term.⁵⁵

A study of the recovering forest understory in a hard-hit Missouri state park found that derecho-affected areas contained more plants, thicker vegetation, and more prairie-type vegetation than nearby undisturbed areas. Birds such as the yellow-breasted chat capitalized on the abundance within this new shrub layer.⁵⁶ Because trees grow slowly in the Ozarks' thin soil and rocky underpinning, it may be decades before the forest's new composition can clearly be determined and even longer before the forest canopy regains its former height and spread. □



COURTESY OF DENISE VAUGHN

Logger Bob May loads timber harvested from Forest Service land near Bunker in August 2013. Most sapwood is degraded and many logs are completely unmarketable.

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