

A Case for Eastern Old-Growth

Can we apply our accumulating knowledge about western old-growth to the cutover forests of the East? Should we?

By CHRIS BOLGIANO

Long enough ago that only old people can remember it, the last of the great eastern forest was felled. Lumbermen sawed first through the Northeast. Then they cut through the Lake States and southward, shearing the last ridgetops and skinning the remote ravines that settlers hadn't bothered with. Oh, they left a few small virgin patches here and there, through oversight or disgust, mostly on the highest peaks and steepest slopes and in the wettest swamps. By 1920, the immense eastern ocean of trees had been reduced to tiny primeval islands in a manmade landscape.

In ways we hardly know how to detect, this holocaustic removal of ancient forests reverberates through the present. Research on the few virgin woods remaining out west has revealed old-growth as a distinct ecosystem within a forest, supporting a vast complex of ecological functions. Many of the scientists researching western old-growth are beginning to wonder aloud whether managed forests anywhere in the world can sustain long-term productivity without a complement of old-growth. New findings about western old-growth could revolutionize the approach to many of the disease, pest, and regeneration problems of the East.

"There are biological and structural principles of old-growth forests that apply equally in the East and the West,"

Chris Bolgiano, a resource writer from Fulks Run, Virginia, contributes often to AMERICAN FORESTS.

Sun spotlights an opening in Joyce Kilmer Memorial Forest, Nantahala National Forest, North Carolina.

says Jerry Franklin, a pioneer in old-growth research, "even though the exact nature of old-growth will vary with forest type and region." Franklin has been systematically exploring old-growth ecology for almost 20 years as a U.S. Forest Service researcher, mostly at the H.J. Andrews Experimental Forest near Eugene, Oregon.

"Old-growth is not just a younger forest grown up to a larger size," he said. "The old-growth stage of a forest anywhere is going to be quantitatively and qualitatively different from younger stages."

The most visible and affecting characteristic of old-growth is very big trees—standing live, standing dead (snags), and downed. A moist mountain hollow with rich, deep soil might produce trees big enough to function as old-growth in 175 years. A south-facing slope with shallow soil might not do so in 300—in fact, it may never produce old-growth. Age, therefore, is less crucial than size.

How big is big enough? The Society of American Foresters (SAF), using Franklin's research data on Douglas-fir, defined an acre of old-growth as having at least 10 living trees that are 40 inches or more in diameter at breast height (dbh), at least four snags and four downed logs 25 inches in diameter and 50 feet long, at least 10 snags 20 feet long, and at least 20 tons of assorted coarse woody debris on the forest

floor. "In the eastern hardwood forest," Franklin said by way of illustrating the difference between forest types, "the amount of deadwood may be less than one-fourth that amount." In any kind of old-growth, however, "you can expect maximum decadence, rotting, and down material."

Because old-growth forests are past the point of maximum wood production, foresters have traditionally considered them unproductive obstacles in the way of young, faster-growing forests. Wood useful to humans, however, is only one fairly inconsequential product of the enormous amount of energy captured as sunlight by the massive leaf areas of huge old trees. Trees use about as much of that

energy to maintain themselves through respiration as to build new wood, so an old-growth forest is generally stable over time.

Stable doesn't mean stagnant. In some places, old-growth forests are as gloomy as myth painted them. But the canopy is not simply one giant parasol against the sun. In the East, the major factor in local "disturbance regimes," to use the elegant ecological term, was windthrow. Fire was second. Insect outbreaks, diseases, lightning strikes, and other random happenings also nicked small openings into the forest, inviting sun-loving wildflowers, shrubs, and subdominant trees to form layers of canopy from the

SELECTED OLD-GROWTH AREAS IN THE U.S.

1 CORKSCREW SWAMP SANCTUARY, southwestern FL: 2,000 acres of baldcypress.

2 JOYCE KILMER MEMORIAL FOREST, Nantabala National Forest, NC: 3,800 acres of virgin forest on "Little Santilla" watershed—yellow poplar, hemlock, northern red oak, scarlet oak.

3 GREAT SMOKY MOUNTAINS NATIONAL PARK, NC & TN: 110,000 acres of virgin forest: 35,000 spruce/fir; 73,000 hardwood with hemlock; 2,000 hemlock with hardwood.

4 SHENANDOAH NATIONAL PARK, VA: About 200 acres of hemlock and white oak.

5 TONESTA NATURAL AND SCENIC AREA, Allegheny and Warren Counties, PA: 3,500 acres of beech, maple, pine, and hemlock.

6 THE HEMLOCKS, Tuscarora State Park, PA: 131 acres of hemlock and cove hardwoods.

7 ALAN SEEGER NATURAL AREA, Huntingdon County, PA: 118 acres of hemlock and white pine.

8 DETWEILER RUN NATURAL AREA, Huntingdon County, PA: 185 acres of hemlock and white pine.

9 SNYDER-MIDDLESWARTH NATURAL AREA, Bald Eagle State Park, Snyder County, PA: 500 acres of white pine.

10 FORREST H. DUTLINGER NATURAL AREA, Susquehannock State Park, Clinton County, PA: 158 acres of hemlock.

11 COOK FOREST STATE PARK, Clarion County, PA: 171 acres of hardwoods.

12 HEARTS CONTENT NATURAL AREA, Allegheny National Forest, PA: 150 acres of mixed old-growth stands.

13 FIVE PONDS WILDERNESS, Adirondack State Park, NY: 60,000 acres of mixed stands of old-growth spruce/fir, conifers, and hardwood.

14 BIG REED POND CONSERVANCY AREA, north-central ME: 3,800 acres of mixed hardwoods and conifers.

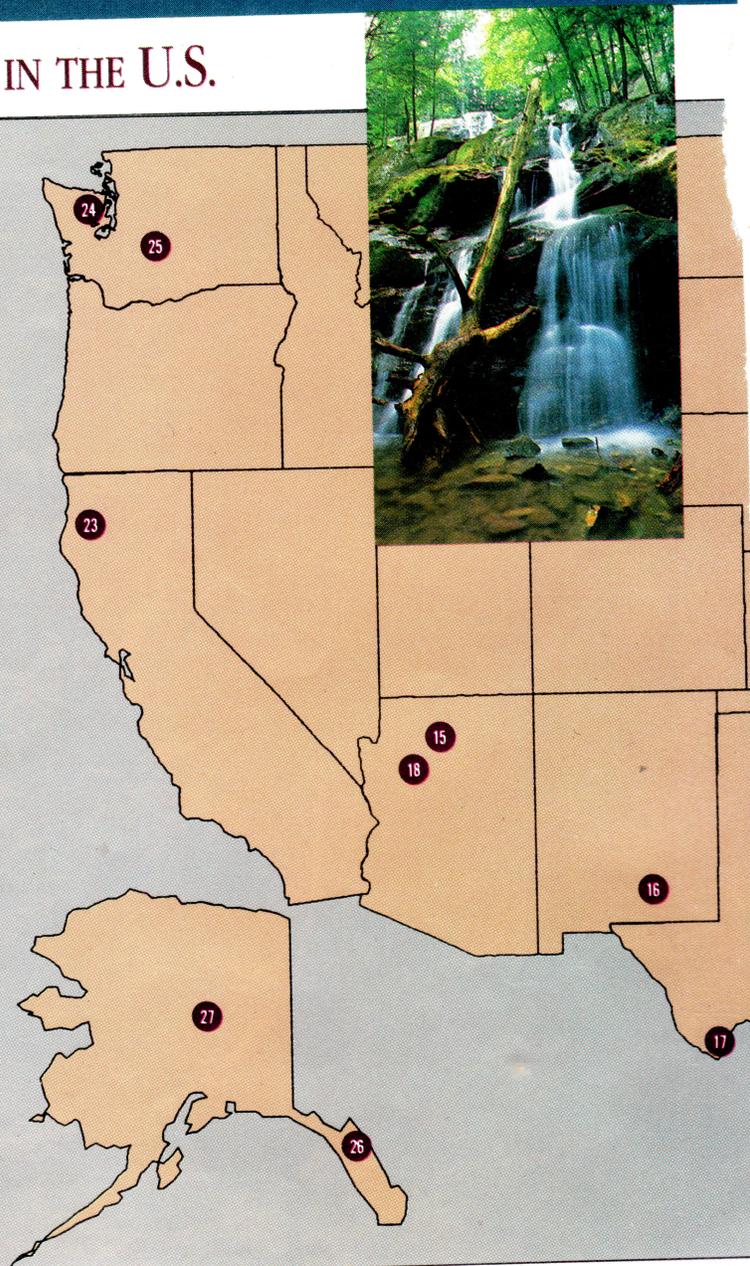
15 PINE HOLLOW STAND, Kaibab National Forest, AZ: 1,200 acres of endangered ponderosa pine.

16 TELSNER RESEARCH NATURAL AREA, Lincoln National Forest, NM: 50 acres of fir.

17 BIG BEND NATIONAL PARK, TX: 2,500 acres of pinyon/juniper.

18 GRAND CANYON NATIONAL PARK, AZ: 129,000 acres: 55,000 ponderosa pine; 49,000 mixed conifers; 25,000 pinyon/juniper.

19 PIONEER MOTHERS MEMORIAL FOREST, Hoosier National Forest, IN: 100 acres of mixed hardwoods.



ground up. As these gaps slowly matured into a perpetuation of the local forest type, other gaps appeared. The descriptive ecological phrase for this, "shifting mosaic steady state," is another of my favorites.

This variety in levels and layers of vegetation is paralleled by a diversity of functions that we've only just begun to grasp. High up, lichens that grow too slowly to exist anywhere but in old-growth take nitrogen from the air, releasing it into the soil as they flake and decay. On the ground, fallen logs are a reservoir of forest life. The small mammals that eat and disperse mycorrhizal fungi, without which trees can't survive, live in fallen logs. Log decomposition

involves bacteria, beetles, fungi, mites, ants, huckleberries, voles, salamanders, shrews, centipedes, flying squirrels, chipmunks...the list goes on. In the hidden region where a fallen log touches the forest floor, small creatures and seedling roots find salvation in the year-round moisture the log retains.

Behind dams of fallen branches, pools form that are quiet enough for spawning by various fish. Sediments are forced to fall there, offering nutrients to aquatic organisms. So effective are the streams at trapping sediments, so buffered from the splashes of raindrops is the forest floor by leaves and woody litter, that erosion and nutrient loss from old-

Photos by Robert C. Simpson



20 SYLVANIA NATIONAL RECREATION AREA, Ottawa National Forest, upper MI: 21,000 acres of hemlock and northern hardwood.

21 LAKE ITASCA STATE PARK, northern MN: 12,000 acres: 8,000 aspen; 3,000 red, white pine; 1,000 birch.

22 LOST FORTY, Chippewa National Forest, MN: 144 acres of red and white pine.

23 REDWOOD FORESTS NATIONAL PARK, CA: 39,000 acres, mostly redwoods.

24 OLYMPIC NATIONAL PARK, WA: 500,000 acres of Douglas-fir.

25 MT. RAINIER, WA: 87,000 acres of western hemlock, red cedar, and Pacific silver fir.

26 TONGASS NATIONAL FOREST, southeastern AK: 5.3 million acres of western hemlock and Sitka spruce.

27 SERPENTINE SLIDE RESEARCH NATURAL AREA, White Mountain National Recreation Area, AK: 2,200 acres of white spruce.

A HOOT for the FUTURE

The spotted owl may answer a loaded question: is sustainable management possible in

In the rapidly disappearing old-growth forests of the Pacific Northwest, the northern spotted owl symbolizes the controversy surrounding the future of the region's remaining ancient forests. As with any symbol, the bird represents a larger cause. The owl, which nests almost entirely in the tree-top cavities and broken snags of old-growth forests, is dependent on the protection of these forests for its survival. It has therefore become the focal point for debates regarding the future of these magnificent forests.

Unfortunately, the attention focused on the owl has led to the characterization of the old-growth issue as an "owls vs. timber-industry jobs" debate. This oversimplification obscures a very basic truth: the environmental and economic health of the region are inextricably linked — one cannot prosper at the expense of the other. Forest management that threatens wildlife and the environment



Banded juvenile owl.

also undermines the region's economic future, dependent not only on commodity values but also on the quality-of-life accompanying a healthy and beautiful environment.

Currently, environmentalists contend that the region is being driven along an unsustainable course of timber-resource extraction. "Every forest-products multinational company in the Northwest (Weyerhaeuser, Boise Cascade, Potlatch, etc.) is logging at a rate that exceeds sustained yield," writes B.J. Williams of the January 1989 issue of *Pacific Northwest* magazine. "They are also following a policy of liquidating old-growth. Georgia Pacific and Louisiana Pacific have logged their Northwest holdings and moved

most of their corporate operations to the Southeast. "The smaller the timber cog in the corporate gear, the more pronounced the trend seems to be," Williams notes.

THE LOST FORTY

Time seems to slow and thicken amid these ancient pines, saved by a surveyor's

North to Blackduck, east to Alvwood, north to County 29, east to County 25, north to Forest Road 2240, west for one mile. Sometimes, when I'm driving there, I understand how the Lost Forty came to be lost. Even with today's roads and maps, it seems to resist discovery. It does not surprise me that in 1882, government surveyors missed the mark on this tract of northern Minnesota forest and designated 433 acres of virgin timber as part of nearby Coddington Lake.

The surveying error saved the already massive red and white pines from the lumber frenzy of the late 1800s and early 1900s. Because the land was officially designated as public water, it could not be sold or logged. Later about two-thirds of the original acreage was in fact harvested, but 144 acres found its way into the National Forest System. It was affectionately dubbed The Lost Forty, a reference to the most common land division in Minnesota logging vernacular.

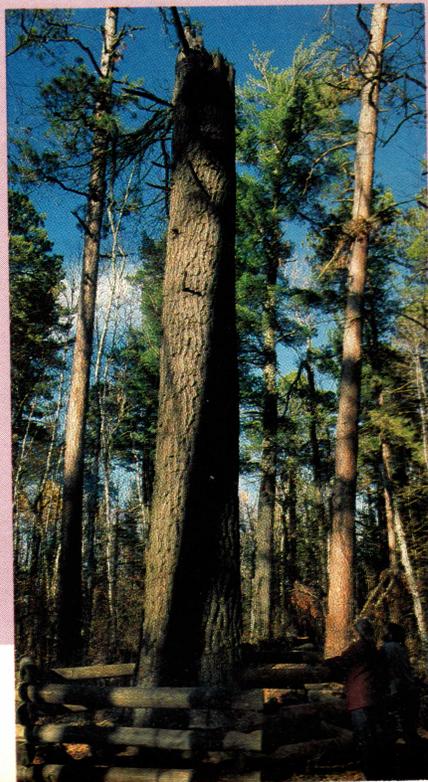
When the trees of the Lost Forty

were spared the woodsmen's ax, they were only 200 to 300 years old, about middle age. Today, at 300 to 400 years, they are the elders of the north woods. They are not alone, of

course. There are other parks and places where visitors can touch and admire the long trunks and shimmering canopies of the reds and whites. But the Lost Forty has a special magic.

Much of that magic comes from the passage we must make to get there. Starting in Bemidji, we drive first on a four-lane divided highway. The woods there are held back; the natural marsh lands are reduced to ditch water. But a few miles out of town, the highway narrows to two lanes. Long tracts of youthful woods are interrupted only occasionally by driveways. Swamps begin to stretch out and harbor ponds with paddling ducks.

Beyond Blackduck, 20 miles north of Bemidji, the woods step right up to the ditch. Houses bury themselves in the trees. We drive slower, partly because



John Swartz

Northwest forests? By FRANCES A. HUNT

"Plum Creek, which manages Burlington Northern's two million acres of land-grant timberland, is logging off its mature timber at a rate that will liquidate those holdings in 10 to 12 years." But a Department of Natural Resources employee who monitors logging for Washington says the timeframe is even shorter: "Try three to five years."

This accelerated logging is a response to several economic stimuli. In a time when corporate timber-management decisions are being made by MBAs more often than by foresters, the emphasis on improving the "bottom line" profit margin is driving the rapid harvest of valuable old-growth forests. Asset-rich, cash-poor timber companies are classic "takeover" candidates in today's business market. Corporations see the liquidation of old-growth "assets" as a means to defend themselves against such hostile takeovers. Furthermore, the strength of the Japanese yen against the American dollar—as well as Japanese demand for high-quality lumber—has led to record exports of unprocessed logs from the region's state and private lands.

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error a century ago. By SUSAN HAUSER

of the road's condition but mostly because time is beginning to take on a different quality. It is hard to hurry here.

We get to Alwood and turn north, then east again. A tamarack bog opens its wide arms. A creek meanders so carelessly that we cross it twice. Going slower yet, we turn onto a gravel county road and then onto the forest road. Ahead a tunnel forms. The sun loses its power. We know we are getting closer. Here and there the ample trunk of a mature red and white pine elbows its way out of the underbrush and younger trees. Then, almost suddenly, we are there. A thick red pine leans at a 45 degree angle over a two-car parking lot. A few feet farther down the road, a trail winds into the trees.

The path into the Lost Forty is common enough. A little gravel has been added in some places, but tree roots still remind us to pay attention. Here it is wide enough for walking side by side; there it forces us to make our way alone. Always the pine trees impinge: cones crunch underfoot, and slick mats of needles play the forest's version of the banana-peel trick. Plastic soles are not recommended. We are torn between looking up, down, or straight ahead. Each level has its own intricacies.

We come to a stand of towering reds. Because their crowns take all the light, little grows at their feet. We leave

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growth forests are barely measurable. Water flowing out of old-growth is the purest available.

Perhaps the most persistent myth about old-growth is that it is a biological desert. At the heart of this notion is the entrenched idea that deer can't survive in old forests. Yet there seemed to be plenty of deer in the virgin East. At the 1981 North American Wildlife and Natural Resources Conference, three noted old-growth researchers—John Schoen, Olof Wallmo, and Matthew Kirchoff—collaborated to review some historical accounts of deer abundance. The market statistics they cited were staggering. Between 1755 and 1773, for example, about 600,000 deerskins were shipped to England from Savannah, Georgia, alone. In the single year of 1878, 70,000 carcasses were transported by rail out of Michigan's Lower Peninsula.

Perhaps whitetail deer have responded so well to restocking and regulated hunting in the second-growth forests of the East because deep snow is far less of a problem than it is for the deer of the Northwest and Alaska. Recent studies there have shown that blacktail deer depend upon old-growth for shelter against heavy snow. Although many animals use old-growth seasonally, in purely numerical terms relatively few are entirely dependent on it. The point is

that the variety of wildlife associated with younger successional stages is common everywhere. Though it supports fewer species, old-growth houses those that can't thrive anywhere else, and which therefore weigh more heavily for biotic diversity than a simple tally of species would suggest.

Old-growth forests don't necessarily represent the final, or climax, stage of forest succession. Richard Lancia of North Carolina pointed to the example of mature southern yellow-pine forests, on which the red-cockaded woodpecker is dependent. "In general, these forests will succeed to a climax of deciduous hardwoods if not disturbed," Lancia said. "But if disturbance occurs on a relatively frequent basis, perpetual old pine forests will result that I would call old-growth."

Now, 60 years and more after the most devastating of all disturbances, large tracts of eastern forest are aging toward old-growth. Of course, it will never be the same. The mighty chestnut is gone; so are the wolves and mountain lions. We won't ever know what humbler species were lost, what secretive salamanders, what shade-loving shrubs were trampled in the rush, just as unnamed species are

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being lost in rainforests today. And so much soil has gone down the rivers that growth in all but the richest sites will probably never equal the past. No one knows what new eastern old-growth will be like, but the ecological reasons for growing it are compelling.

Regrowing eastern old-growth raises the same basic questions managers out West are struggling with: How much is enough, and where should it be?

Virtually no western old-growth remains on private lands; the market incentive is too great, and that will be the case in the East. It is only the National Forests that are expansive and protected enough to hold promise for eastern old-growth. In recent years, several scientists have applied theories of island biogeography to suggest how old-growth patches could be designed into fragmented, managed forests: sized to elude the distortion of edge effect, shaped according to the idiosyncrasies of terrain, and connected by greenways into a regional supersystem.

To what extent are eastern National Forests planning toward this ecological ideal of landscape management?

None of the forest plans in the eastern and southern regions, which together administer the 24 million National Forest acres in the eastern half of the country, specify that old-growth be provided on lands classed as suitable for harvesting. Old-growth is a management objective in some plans, generally for wildlife purposes, but that objective is usually met by the part of a forest classed as unsuitable for timber harvest. Yet lands too steep or dry or thin-soiled to be harvested will hardly grow quality old-growth. Representatives from both regions pointed out that the "unsuitable" category also includes richer sites not needed to meet timber demands by the year 2040. Areas not needed now will, of course, become suitable whenever demand warrants.

It was difficult even trying to talk about such an unknown as eastern old-growth. Robert Radtke, wildlife group leader for the Forest Service's eastern region, exemplified the need for formal definitions. "In most cases big trees are not an old-growth condi-

tion in the East, because eastern stands aren't dominated by big trees but by a large amount of dead vegetation," he said, in direct contradiction to Jerry Franklin's conclusions. "The East is so different from the West, I'm not sure basic old-growth principles are the same."

In the past year the Forest Service has formulated a national definition of old-growth. "As you would expect, it is rather general in dealing with sizes of trees, amount of dead material, and so on," says Karl Bergsvik, assistant director for timber management in the Washington office, who has worked for years on old-growth definitions. "The idea was that individual forests would specify the particular characteristics of their forest types."

Bergsvik agreed that it may be difficult for eastern forests to plug numbers into the definition without locating and studying remnant virgin patches. "I'm not sure that any such research is currently under way," he said, but he felt certain that eastern old-growth would come up as an issue "in the next round of forest planning, if not before."

One of the largest of the few remaining laboratories of eastern old-growth is in Great Smoky Mountains National Park, which boasts 100,000 acres of virgin woods. Smaller patches are contained in some Wilderness Areas, a handful of state parks, and a few experimental forests such as Hearts Content in Pennsylvania (see map and sidebar on pages 28-29). Undoubtedly, in the 24 million acres of eastern National Forests, there are some secret hillsides of giant trees that for one reason or another escaped the saw. Only an inventory would reveal them.

Eastern National Forests have for years been gathering the inventory data that could enable them to locate virgin stands, as well as second-growth with potential for producing quality old-growth. Robert Radtke reports that in addition to other characteristics, all stands in the eastern region have now been identified by 10-year age class. According to Ralph Mumme, southern regional director of timber, inventory work there has been

expanded to include more accurate tree ages and understory descriptions.

Radtke and Mumme both spoke longingly of the time, in three to five years, when the computerized GIS (Geographical Information System) now being tested in both regions will be operational. Once inventory data is input, GIS can print out a map that collates such parameters as tree age, site index, stand density and distribution, species composition, and drainage features. Thus potential high-quality old-growth stands could be viewed in context with the surrounding landscape simply by pressing a few keys—a tremendous timesaver over coloring maps by hand.

Could stands with great potential be silviculturally manipulated to speed up development of old-growth characteristics? At this time most scientists think not, although some interesting speculations on thinning have emerged. Some experimental work has been done on tree wounding to promote cavities. Several old-growth researchers have commented that large woody debris should obviously be left after a harvest in stands designated for old-growth. There's a lot of room here for investigation by both scientists and managers.

The rotation time between harvests is crucial. Ralph Mumme identified the longest rotation length in the southern region as 150 years. Robert Radtke recalled that one or two forests in the eastern region had specialized conditions calling for rotations up to 300 years. In both regions, a sort of de facto rotation of three to six centuries emerges if the amount of harvest proposed in current plans, which amounts to less wood than the forests are expected to produce, is projected into the future.

De facto old-growth, vulnerable to every market whim and political whimsy, hardly guarantees the long-term ecological stability that old-growth clearly confers. With eastern stands now aging, GIS soon available, and research pointing in new directions of thought, it's time to look beyond the trees and plan for the long life of a new great eastern forest. **AF**