

# EVERGREEN

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## THE BOUNTIFUL HARVEST Securing America's Forest Future

Deb and Rick Smith, Smith Logging, Kalispell, Montana



*“In logging, as in forests and forestry, the only constant is change. Over the last century, we have moved from brute strength to waterpower, from animal power to steam and, finally, the internal combustion engine. The future cannot and will not be held back. We either embrace change or we perish.”*

John Manz, see “Logging Comes of Age,” Page 30



U.S. Forest Service

On Washington's Olympic Peninsula, loggers and the tools of their trade, circa 1900



Timberjack

Timberjack's Walking Harvester is a concept machine not yet commercially available. It was developed to test environmentally sustainable methods of mechanized logging, and has already yielded several important advancements in both automation and hydraulics. Timberjack cut-to-length technology is featured on Page 34.

Cover photo: Stephanie Steck, Northern Lights, Bigfork, Montana

*We must always consider the environment and people together, as though they are one, because the human need to use natural resources is fundamental to our continued presence on Earth*

Jim Petersen, *Evergreen* Magazine, 1989

In this issue we write about timber harvesting in America's privately owned forests. "The Bountiful Harvest: Securing America's Forest Future" is one of the most uplifting stories we've told in the 16 years we've been publishing *Evergreen* Magazine.

Most Americans equate timber harvesting with egregious environmental destruction. Small wonder. It's been more than 20 years since the forest products industry mounted a serious and well-funded campaign designed to explain the role harvesting plays in the management and protection of the nation's privately owned forests. The last such effort involved "Green America," a quarterly publication of the now defunct American Forest Institute. It was both the inspiration for *Evergreen* and a dependable source of perspective for this writer during his years as a working journalist.

In the years since AFI closed up shop the industry's altogether too small communications budget has been diverted to other seemingly more important matters. But what could be more vital to forestry's future than seeing to it that each new generation of Americans grows up with a bedrock understanding that periodic timber harvesting is good for forests?

Not so many years ago even non-timber companies took on the job of explaining forestry to the nation's school-age youngsters. In war-torn 1943, the Coca Cola Bottling Company distributed four beautifully illustrated "Lumber" posters. Designed for use in classrooms, each "Our America" poster highlighted a different sector in what was then one of America's most admired and strategically vital industries: the forest products industry. No. 1 in the full color series [reproduced nearby] highlighted logging; No. 2 transportation; No. 3 wood uses and No. 4 developing new uses for wood.

It would be wonderful if Coke would



One of four beautifully illustrated "Lumber" posters distributed by Coca Cola to the nation's classroom teachers in 1943 (Gifted to *Evergreen*, Hermann Brothers Logging Co., Port Angeles, Washington).

re-issue these historic posters, if only to show just how far forestry has come over the last 60 years, but the refreshing candor they convey can't even be found in timber industry literature today. Such is a measure of just how far our feel good culture has waded into the political correctness swamps. In this issue of *Evergreen* we hope to light the way out of the swamp.

In the course of our two-year investigation we traveled to 17 states, conducted more than 100 interviews, reviewed more than 200 scientific studies and took more than 2,000 photographs. We could have easily written a book covering what we learned, but ever-present budget constraints limit our report to a smattering of history, science and from-the-scene reports written in a conversational style that we hope stimulates your further interest in the role forest management is playing in providing our nation with

forests that are tangibly and intrinsically abundant.

Begin with this one fact: there are nearly ten million private forest landowners in the United States. Their forestry objectives are as diverse as the 358 million acre landscape they own. Many own forests for the simple pleasure they bring. Others with names like Weyerhaeuser and Boise Cascade are big-time lumber and paper producers and are constantly on the lookout for ways to increase forest productivity. But Forest Service surveys reveal most of the nation's private landowners own forests because they enjoy wildlife and hunting. For these landowners, timber harvesting is the tool of choice for creating, protecting or enhancing game habitat.

No matter the motive, timber harvesting is a vastly different enterprise than it was a generation ago. Gone are the days when luck and determination were all that was needed to propel a young man—often a high school dropout—to success in the logging industry. Chainsaws that cost a few hundred bucks have given way technologically advanced light-on-the-land logging systems that cost more than one million dollars. Bankers who thought nothing about financing pickups and saws think long and hard before financing such machines. Business plans and pro forma's are necessities, and advanced degrees in business, finance, forestry, engineering, even biology, are increasingly common among successful loggers.

This issue's many facets are made more meaningful if you start with the knowledge that in the late 1800s fear of a wood famine was so widespread that Congress created the National Forest system to insure that the nation would not run out of wood. Today, thanks to the billions of public and private sector dollars invested in science and technology,



America's forestland base is still 70 percent the size it was when the Pilgrims landed in 1620, and now lumber and paper are traded as commodities rather than the luxuries many feared they would become. This despite the enormous and still expanding wood fiber demands of a U.S. population that has grown from an estimated 3.9 million in 1790 to a surveyed 248.7 million in 1990. So the irony: it is the *abundance* of wood fiber — not its scarcity — that makes the public debate about "saving forests" possible. To the extent that some environmental groups continue to promote conflict and refuse to acknowledge the capital investments that loggers and landowners are making in forest stewardship, the nation's access to this abundance is at risk, for in the global marketplace capital is both fleeting and easily exported. As one logger suggested, "The question is not whether we will log, but what language we will speak on the job." The connect-the-dots message for Americans who are worried about their forest legacy is simply this: landowners who are not permitted to manage their forests for the assets they value most will eventually sell to land developers, further limiting public access and perhaps irreparably damaging large expanses of wildlife habitat. This possibility is already a looming fear in the Northeast.

As is our custom, we have laid out this issue to be read from front to back. Each story builds on the next one, adding new perspective to your understanding of what it has taken to create this nation's forest bounty.

We begin with "Whither Sustainability," a short piece in which we point out that while public interest in protecting the environment is at an all time high, no country on earth consumes more wood fiber on a per capita basis than the United States. Many scientists believe the nation should be producing more of the wood fiber it consumes, but there is scant public support for such self-sufficiency.

Thereafter, in "Photosynthesis: Harnessing the free energy of the sun," New Zealand scientist Wink Sutton explains how trees make wood, and why wood should be the structural building material of choice for a society concerned about its impacts on the environment.

Our main story, "The Bountiful Harvest: Securing America's Forest Future," is actually 13 stories in one. Nature, history, science, technology,

politics and personal choices help shape a reprise filled with hope and resolve.

Though not long, "Logging Comes of Age" might well be the most surprising story in this issue. Few people realize just how profoundly the logging industry has changed over the last 20 years. Technological advancements have speeded the transition, but it is the arrival of a new



Stephanie Steck

Rick and Deb Smith, husband and wife logging team from Kalispell, Montana, beside one of two late mechanical harvesters they own.

generation of business-first loggers that is driving a culture turned profession into the new century. The hell-roaring days are gone. Safety, conservation, productivity, efficiency and sustainability are the new watchwords.

There simply is not sufficient space in a 40-page magazine to use all of the information we gathered in the course of our long investigation. But thanks to a grant from Timberjack we now have a fine website, [www.evergreenmagazine.com](http://www.evergreenmagazine.com). For additional perspective be sure to log on and read "A Word About Frankentrees," "Forestry at the Millennium," "Certification in Oregon" and "Certification Wars: Why SFI Will Win."

As is always the case, we have a great many people to thank for their help with this issue. Among them, Richard Lewis

and the members of the Forest Resources Association. Minus their support — and that of the Oregon Logging Conference, Timberjack, Caterpillar and the Washington Contract Loggers Association — this project would never have been completed.

We thank them — and take pleasure in calling your attention to our Page 37 story about Log A Load For Kids, a remarkable charity that now enjoys wide support among loggers and forest landowners.

Thanks also to Bob and Bart Depratu of Depratu Ford, Whitefish, Montana and Terry Andreessen, Timberline Auto Center, Libby, Montana for their roles in persuading the Montana Ford Dealers Advertising Association to donate a new 2001 Ford F-250 pickup to The Evergreen Foundation. See Page 38.

Bill Hagenstein, a friend of 30 years, read the entire manuscript at my request. At age 85 he is beyond doubt forestry's greatest living historian. I asked him to make certain we told a story that was both accurate and reflective of historic and political nuances that are so often missing from today's reporting. He says we did. I am again in his debt.

Finally, we want to thank Rick and Deb Smith for appearing on the cover of this issue. The Smiths are the first husband and wife logging team to ever appear on an *Evergreen* cover. We posed their photograph — another *Evergreen* first — because they rarely work side by side. Most days Rick is in the woods before daylight while Debbie stays behind to answer phones, take care of the company books and chase parts for the woods operation. Their business typifies today's small family-owned

logging company. We write about them in Chapter 13 of our main story.

If you take only one lesson away from this issue, take this one: where harvesting, public concern and forest policy converge we have many more choices than the Eden-or-Armageddon scenario so many Americans seem to have embraced. Science and technology provide an array of management choices that is unprecedented in forestry's American experience. These choices, freely exercised by the nation's private landowners, are the reason why America is blessed with such an abundance of productive and biologically diverse forests. From where we sit, America's forest future is in good hands.

*Onward we go,*  
Jim Petersen, Editor

# Whither Sustainability?

**N**o country on earth consumes more wood fiber on a per capita basis than United States: 2.27 cubic meters per person per year — 4.1 times the world average.

Indeed, prosperity-driven consumption of raw materials [wood fiber, minerals, petrochemicals, cement and fossil fuels] is at an all time high in the U.S. By these measures at least, Americans enjoy a standard of living unmatched in world history.

Public interest in protecting the environment is also at an all time high. New groups interested in saving new things pop up almost daily. One of the most interesting observations about this trend was made a few years back by conservationist and author, Alston Chase. ["Playing God in Yellowstone and In A Dark Wood"]

"Environmentalism increasingly reflects urban perspectives," he wrote. "As people move to cities, they become infatuated with fantasies of land untouched by humans. This demographic shift is revealed through ongoing debates over endangered species, grazing, water rights, private property, mining and logging. And it is partly a healthy trend. But this urbanization of environmental values also signals the loss of a rural way of life and the disappearance of hands-on experience with nature. So the irony: as popular concern for preservation increases, public understanding about how to achieve it declines."

One of the most broadly based and certainly most vexing environmental discussions to surface in recent years concerns the quest for sustainable development. Even the United Nations has

APA: The Engineered Wood Association



Housing starts remain strong in the U.S., thanks to low interest rates. Year 2000 housing starts totaled 1.57 million units, down from a record 1.64 million in 1999. In line with the decline, U.S. lumber consumption declined from a record 54.3 billion in 1999 to 53.9 billion board feet last year. Single-family housing, the largest market for lumber, declined 5.5 percent to 1.23 million units. Each new single-family home uses an average 14,175 board feet of softwood lumber. [Source: Western Wood Products Association]

taken it on, much to the consternation of critics who see the discussion as little more than a scheme for forcefully transferring wealth from rich to poor nations.

Still, it is hard to argue against the idea that development of the earth's land base, and its natural resources, ought to proceed in an orderly manner. But according to Dr. James Bowyer, who directs the University of Minnesota's Forest Products Management Development Institute, there is an even more fundamental problem that champions of

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***"If we are really serious about protecting the planet from unsustainable development — which is the basis for the whole sustainability discussion — shouldn't America produce much more of what it consumes than it is?"***

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- Dr. Jim Bowyer

sustainability seem unwilling to address. "If we are really serious about protecting the planet from unsustainable development — which is the basis for the whole sustainability discussion — shouldn't America produce much more of what it consumes than it is?"

Dr. Bowyer has been asking this question for years because, as he points out, the U.S. is a net importer of every category of basic raw material consumed in its factories. These raw materials often come from countries where none of the environmental constraints imposed on domestic producers exist. Moreover, the U.S. is importing an increasing amount of the wood fiber it consumes — while systematically restricting or eliminating logging in U.S. forests.

The hypocrisy of America's increasingly consumptive lifestyle has not gone unnoticed. Doug MacCleery, Assistant Director of Forest Management for the U.S. Forest Service, struck a nerve in a thought-provoking piece he wrote last year for *Forest History Today*. In it, he suggested that it is time for the nation's conservation ethic to be paired with a consumption ethic.

"Since the first Earth Day in 1970 the average family size in the U.S. has dropped by 16 percent, while the average single family house being built has increased by 48 percent. The U.S. conservation community and the media have given scant attention to the 'ecological transfer effects' of the mission shift on U.S. public lands. Any ethical or moral foundation for ecological sustainability is weak indeed unless there is a corresponding focus on the consumption side of the natural resource equation."

Between 1987 and 1997, timber



harvesting on U.S. federal timberlands dropped 70% from about 13 to 4 billion board feet annually. The decline, driven by public disfavor with harvesting in National Forests, removed one-third of annual U.S. softwood lumber production from the marketplace, transferring demand to private timberlands and to forests in other countries, a move that Dr. Bowyer criticizes.

“Look at the amount of ozone-polluting fossil fuel that is being consumed to bring logs and lumber to the U.S. from distant lands,” he declares. “And look at what is happening to native forests in countries that are making up the shortfall created by our unwillingness to harvest timber from our own forests. Rather than impose such a horrific environmental burden on other countries, we ought to be increasing production in our own country where harvesting is regulated, where we know how to grow and harvest trees with minimal and temporary environmental degradation.”

There is no accurate count of the number of federal, state, county and municipal laws private forest landowners must now abide by, but it surely runs into the thousands. In the most restrictive states — Oregon, Washington and California — harvesting occurs under the watchful eye of state regulators who frequently make surprise visits to active logging operations. California requires written harvest plans which must be approved by the state before harvesting can begin, typically a two-year process. Mr. MacCleery believes most Americans are unaware of these regulatory processes and are additionally oblivious to the overseas environmental impacts of their consumptive lifestyles because, unlike timberland owners, loggers, farmers and ranchers, they lack a cultural connections to land. In fact, less than two percent of the nation’s population is now engaged in farming. Fewer still grow trees as a crop.

“Adopting a land ethic is easy and painless for most of us today because it imposes the primary burden to act on someone else,” he wrote in his *Forest History Today* article. “While few of us are resource producers any more, we all remain resource consumers. This is the one area we all can act upon that could have a positive effect on resource use, demand and management. Yet few of us connect our resource consumption to what must be done to the land to make it possible. At the same time many of us espouse the land ethic, our operating motto in the marketplace seems to be ‘shop ‘til you drop’ or ‘whoever dies with the most toys wins.’”



Jim Petersen

Doug MacCleery's book, "America's Forests: A History of Resiliency and Recovery," is an excellent primer for anyone wanting a well-documented snapshot of the nation's forests.

***“Adopting a land ethic is easy and painless for most of us today because it imposes the primary burden to act on someone else.”***

- Doug MacCleery

No less a conservationist than Aldo Leopold long ago warned of the environmental risks that confront a society in which conservation and consumption have been de-coupled. “A public which lives in wooden houses should be careful about throwing stones at lumbermen, even wasteful ones, until it has learned how its own arbitrary demands as to kinds and qualities of lumber, help cause the waste which it decries,” he wrote in 1928. “The long and the short of the matter is that forest conservation depends in part on intelligent consumption, as well as intelligent production of lumber.”

But modern environmentalism seems to have strayed down a much less productive pathway than the one Mr. Leopold pointed out. Since the early 1970s many in the movement, including Stanford University’s Paul Ehrlich and the Worldwatch Institute’s Lester Brown, have been forecasting global famine, species extinction, exhaustion of natural resources and catastrophic pollution of air and water. Their solution: economic austerity, global population control and U.N. oversight of resource development and regulation.

Fortunately, none of their dire predictions have materialized, nor is there any agreed upon scientific evidence that they will. This point is made in countless books and scientific studies, most recently “The Skeptical Environmentalist,” by former Greenpeace activist Bjorn Lomborg, a statistician at the University of Aarhus, Denmark.

“The trouble is, the evidence does not back up this [environmentalist] litany,” Dr. Lomborg wrote in the Aug. 4 edition of *The Economist*, a British business journal. “First, energy and other natural resources have become more abundant, not less since the Club of Rome published ‘The Limits of Growth’ in 1972. Second, more food is now produced per head of the world’s population than at any time in history. Fewer people are starving. Third, although species are indeed becoming extinct, only about 0.7% of them are expected to disappear in the next 50 years, not 25-50%, as has so often been predicted. And finally, most forms of environmental pollution either appear to have been exaggerated, or are transient — associated with the early phases of industrialization and therefore best cured not by restricting economic growth, but by accelerating it. One form of pollution — the release of greenhouse gases that causes global warming — does appear to be a long-term phenomenon, but its total impact is unlikely to pose a devastating problem for the future of humanity. A bigger problem may turn out to be an inappropriate response to it.”

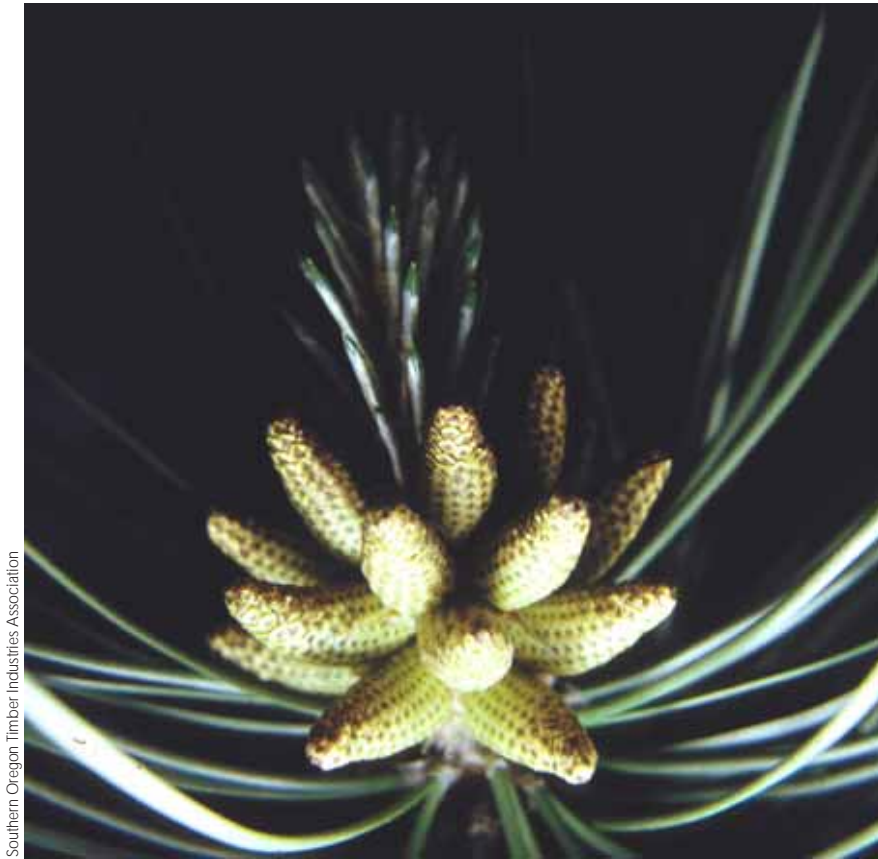
Evergreen Foundation economist, Dr. Con Schallau agrees that economic expansion holds more promise for reducing global pollution that does restricting growth.

“Thanks to impressive advancements in exploration and utilization technologies — adjusted-for-inflation — raw material costs have been declining steadily for more than a century,” he observes. “Economic expansion — not restrictions on growth — is indeed the best strategy for averting future environmental calamity. Unlike impoverished developing nations, affluent societies can afford to make capital investments in technologies that increase land productivity and manufacturing efficiency while also minimizing related environmental impacts. Once developed, these technologies can — and are — being shared with emerging nations.”

What does it all mean? Well, just as Caterpillar observed years ago in its thoughtful and long running *National Geographic* advertising campaign, “There are no easy answers, only intelligent choices.”

# PHOTOSYNTHESIS:

## Harnessing the free energy of the sun



Southern Oregon Timber Industries Association

Like all plants this ponderosa pine bud draws life from the free non-polluting energy of the sun.

**Editor's note:** Dr. W.R.J. (Wink) Sutton is a botanist of considerable renown. Now a private consultant in New Zealand, his career path included 27 years with the New Zealand Forest Service, 12 years with Tasman Forestry (now Fletcher Challenge Forests) including two years with the Canadian Federal Forest Service in Victoria, BC. He holds degrees in botany, chemistry and forest economics, and is an authority on radiata pine plantations. He is an officer in the New Zealand Order of Merit, a fellow of the New Zealand Institute of Forestry and an honorary member of the Society of American Foresters. He is a frequent contributor and advisor to *Evergreen*.

### Dr. Sutton, what is photosynthesis?

Photosynthesis is the process by which plants, including trees, capture visible light energy and, with the aid of chlorophyll, convert water from the soil and

carbon dioxide from the atmosphere into glucose (sugar) and oxygen. Subsequently, glucose is converted into other organic chemicals, the most common being cellulose—a water insoluble polymer containing about 10,000 glucose molecules laid end to end. In trees, these organic chemicals are converted to wood—a very complex cellular structure with a very high strength to weight ratio that makes it ideal for use as a construction material.

### Lumber manufacturers tout the “free non-polluting energy of the sun” when describing the environmental advantages of wood over other structural building materials, especially steel. What is the significance of this phrase?

It takes about ten times as much energy to manufacture steel as it does to make the equivalent amount of wood. The smelting process by which iron ore is

converted into steel relies heavily on fossil fuels—especially coal—that release carbon dioxide and other gasses into the atmosphere. By contrast, the only energy needed to initiate photosynthesis comes from the sun. We pay nothing for the sun's energy and it does not pollute the atmosphere. Once the solar-powered wood formation process is completed only a modest amount of additional energy is needed to convert the wood of a tree into finished lumber.

### Is the sun our most important renewable energy source?

Yes. The sun's energy is vital to all life forms on earth—and of course to photosynthesis. Fossil fuels, which currently power much of the industrialized world, are finite. Someday they will be gone. But as long as the sun continues to rise every morning, it will remain the most important of our known sustainable and renewable sources of energy. Other

renewable energy sources include geothermal, tidal and nuclear fission, which is of course, very controversial. Hydro and wind are also important renewable energy sources but they are in fact forms of solar energy — the result of warming by the sun. Sun powered photosynthesis offers civilization a real bonus because it provides not just a way to store solar energy but also a way to create structural building materials and other solid wood products while storing or recycling carbon dioxide, thereby helping to mitigate the environmental impacts of global warming.

### What gives wood its high strength to weight ratio?

Cellulose accounts for wood's great strength. If you look at it with the aid of a powerful microscope you see a honeycomb-like structure which is very strong for its weight. As trees, these complex cellular structures can carry tremendous loads and withstand enormous natural forces. It is thus ideally suited for use in structural applications including floor joists, rafters, framing walls, bridge timbers.

### How is it that trees help clean the air?

Once again, we have photosynthesis to thank. As trees grow, they act as carbon sinks, absorbing atmospheric carbon dioxide and converting it to wood. Although both fossil fuels and wood are essentially stored solar energy, their use has a very different effect on the net level of carbon dioxide in the atmosphere. When the carbon from fossil fuel is released into the atmosphere it stays there for millions of years, but as forests grow they re-absorb released carbon dioxide creating new wood. As long as forests are sustainably managed — meaning the wood harvest is no greater than the tree volume increment — our civilization can use as much wood as it wants for as long as it wants, with no permanent increase in atmospheric carbon dioxide. This is why any proposed carbon tax on wood consumption makes absolutely no sense.



Dr. W.R.J. "Wink" Sutton holds degrees in botany, chemistry and forest economics and has written widely on the environmental advantages of wood over other, non-renewable structural materials.

### You are on record as saying wood may someday replace petroleum-based chemicals.

Yes I am. We have some distance to go in terms of basic research, but the idea intrigues me. I see no reason why a raw material as complex as wood cannot be broken into its molecular components, then reformulated as wood-based chemicals. Biomass fuels, ethanol and methane, are just the beginning. Wood is already used in perhaps 100,000 applications. There is every reason to believe that there are many more potential uses for wood, many of them will be complex organic chemicals and compounds. We could use wood to make all of the petrochemical products that are currently made from fossil fuels.

### In the future, will most of the world's wood come from plantations?

An increasing amount certainly will. I can't see how else we can meet the needs of a world population that is expected to top ten billion by mid-century. Natural forests currently supply 80 percent of the annual industrial wood harvest, but there

is growing political pressure to conserve natural forests. Planted forests have distinct advantages over natural forests: faster growth, trees grown as crops specifically with specified wood properties and the certainty that the fiber will be there when the market demands it. Per capita wood consumption has declined slightly over the last decade in industrialized nations, but it is still increasing in emerging economies. Given rising energy costs and global warming concerns I don't expect energy intensive wood substitutes, including steel, will take a larger market share than they now have, so it is likely that the worldwide investment in forest plantations will increase dramatically in this and future decades.

### What would you say to people who believe that timber harvesting destroys forests?

For millions of years, forests all over the world have demonstrated a remarkable ability to recover from all sorts of catastrophes, including horrific wind storms, massive wildfires, devastating volcanic eruptions and insect and disease infestations. In nature and with harvesting, successful regeneration depends on some of the forest remaining intact. In harvesting, sustainable management is the key. This insures that only a relatively small area of the forest is harvested at any one time, and that the forest as a whole remains intact. I would also ask people to consider the miracle of photosynthesis. Here is a natural process powered by the sun that converts water from the soil and carbon dioxide from the atmosphere into glucose and oxygen. The result is wood, civilization's most versatile raw material — a material that is environmentally benign, renewable, recyclable and biodegradable. I know of no other earthly process that uses so little energy to create so many life-giving benefits. So long as harvesting is done sustainably in an environmentally responsible manner, there are no downsides to the continuing use of wood. The world should be using more wood, not less.



# The Bountiful Harvest: Securing America's Forest Future

*"The cultivation of trees is the cultivation of the good,  
the beautiful and the ennobling in man"*

J. Sterling Morton, Arbor Day Founder

An Essay By James D. Petersen Editor, *Evergreen Magazine*

**T**here are nearly ten million forest landowners in the United States. Global powerhouses like Weyerhaeuser and International Paper own millions of acres of timberland and, by virtue of their very size and reach, seem destined to grow even larger.

Then there are the mid-size fleet-of-foot niche marketers like Boise Cascade, Willamette, Mead and Westvaco. Their family-like cultures mask the fact that they are just as sophisticated and technologically advanced as their larger competitors.

But the industry's family roots are becoming increasingly difficult to trace. This fall, Mead and Westvaco became the latest in a long line of much admired companies to announce their intent to merge. More mergers are anticipated as mid-sized companies scramble to fend off acquisition-minded companies ten times their size.

The big and mid-size outfits share a common goal: to increase the per acre

productivity of their forests. As in the natural world they seek to control, survival of the fittest is a rule with no exceptions.

But for all their size, individuals and families own more of America's forests than do the industrial giants. Their myriad reasons for owning land make it impossible to generalize about them. These are the David Hale's,

George Fenn's and John Ulrich's of the world: entrepreneurs who own forests for the joy and income it brings them or because they long ago committed their lives to forestry.

Together, the giants, the near giants and the entrepreneurs own 73 percent of the productive timberland base in the United States, nearly 358 million acres.

From these privately-owned acres come 82 percent of the nation's annual harvest: roundwood logs for dimension lumber and engineered wood products and pulpwood logs for paper and packaging products. There is no

accurate accounting of the amount of money these companies and individuals annually invest in forest productivity, roads, advanced manufacturing technologies and regulatory compliance but it most certainly runs into the tens of billions of dollars.

Remarkably, their workhorse forests—all privately owned—also account for nearly 70 percent of all wildlife habitat found in the United States. Most of the nation's drinking water also rises from these forests and more Americans hunt and fish here than on public lands. Taken together, these forests comprise an unrivaled bounty, a diverse and beautiful landscape that is a tribute to the skill, perseverance and vision of companies and individuals whose conservation ethic, though varied, has contributed mightily to this nation's economic and environmental well being.

*This is their story.*

Potlatch Corporation's Three Corners Plantation in north-central Idaho. The 12-year-old Douglas fir trees in this 1992 photograph are already 18 feet tall, eight feet taller than the 22-year-old-Douglas firs in an unmanaged forest nearby.





On January 20, 1942 thirteen forestry legends gathered in the Gold Room at the old Portland Hotel in downtown Portland, Oregon to certify America's first Tree Farms. In the course of their four-hour meeting, they certified 16 plantations totaling 726,617 acres in Oregon and Washington. The event — and World War II — signaled the dawning of forestry's golden age. The gold is still flowing.

Led by W.B. Greeley, the third Chief of the United States Forest Service and arguably its greatest conservationist, the gathering included three Yale forestry school graduates, including Greeley, two from the University of Washington and one each from Oregon State, Penn State, the University of Minnesota and the Biltmore Forestry School. Only one of the thirteen survives: University of Washington graduate W.D. Hagenstein, then 26 years old, took the minutes.

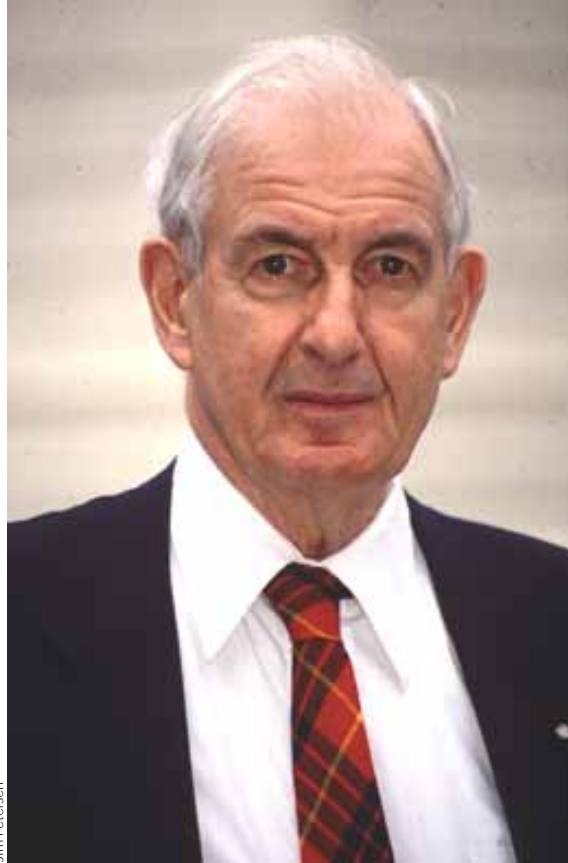
"It was a watershed moment in forestry's long history," recalls Mr. Hagenstein, now 85 and still living in Portland. He was then a young forester with the West Coast Lumbermen's Association [WCLA], which spearheaded formation of the American Tree Farm System. Though long since retired, he remains one of forestry's most eloquent spokesmen and perhaps its greatest living historian.

"I was a youngster among giants," he modestly recalls. "But to tell you honestly I'm not certain any of us understood the significance of the day. You have to remember, the nation had been plunged into a world war. It took precedence."

Six months before the Portland meeting, on June 12, 1941, the Weyerhaeuser Company dedicated what would become the nation's first Tree Farm near Montesano, Washington. But because of paperwork delays Tree Farm Certificate No. 1 was not issued until September 1942, nine months after the first 16 Tree Farms were certified.

Mr. Hagenstein, who had gone to work for WCLA a week earlier, attended the dedication and recalls events leading to it. "Weyerhaeuser foresters began a compre-

hensive evaluation of the company's Montesano property in 1940. Their study showed the land held great tree growing potential, but that the risk of wildfire was quite high. So they recommended the company invest about a dollar an acre in a fire prevention program that included adequately maintained roads, construction of lookout towers and water holes and the purchase of fire fighting equipment and a communications system."



Forestry's greatest living historian, Bill Hagenstein, outside his office in downtown Portland, Oregon.

To enlist public support for fire-proofing the area, which included 130,000 acres of company land and another 65,000 acres of state, county and private land, the company invited Washington Governor Arthur Langlie to dedicate the property as the Clemons Tree Farm: "Clemons" after Charles Clemons, owner of the Clemons Logging Company before it became a Weyerhaeuser subsidiary — and "tree farm," a word-picture name suggested by local newspaper editor Chapin Collins.

The ceremony marked the end of a four-year Weyerhaeuser public relations blitz designed to quell public fears that the nation would soon run out of timber. "Timber Is A CROP!" the company declared in 1937 print advertisements in which it made the case for public policies

that encouraged protection and management of forests. "As with other crops, forests must be harvested when mature or ripe," the text read. "Upon maturity, trees cease to grow rapidly and eventually decay and die. By removing mature timber and replacing it with a vigorous young forest, national wealth is increased and supplies of raw material are maintained for the greatest industry in the Northwest."

But it was Bill Greeley, who became WCLA secretary-manager in 1928, and George S. Long, Weyerhaeuser's first general manager, who years earlier set the stage for formation of the American Tree Farm System. In January 1909, Mr. Long invited Mr. Greeley — then Forest Service District Forester for 41 million acre District One [now the Forest Service's Northern Region] — to a meeting in Spokane, Washington to discuss formation of a series of forest fire-protection cooperatives. The two men shared a common enemy: wildfire. In Mr. Long's case, memories of the disastrous 1902 Yacolt Fire which destroyed 23 square miles of company timberland in southwest Washington. In Mr. Greeley's case the largest forest fire in American history: the Great 1910 Fire, a colossus that leveled three million acres of District One timber, most of it in two days and nights.

Following the Spokane meeting, the two men played leading roles in the formation of a series of fire fighting cooperatives that were central to Mr. Long's 1909 decision to begin a quiet search for ways to ensure that there would be "another new crop of timber ready to cut before the old one is gone."

Mr. Long's vision, now recognized as the cornerstone for sustainable forestry, was revolutionary in an era when wildfires made it very difficult for landowners to justify investments in reforestation. But it eventually gained acceptance with other landowners, thanks to Mr. Long's considerable lobbying skills and Mr. Greeley's leadership as Chief of the Forest Service, and later secretary manager of the WCLA.

Unlike the Forest Service's legendary first chief, Gifford Pinchot, who favored federal action to stop "cut and run" logging on private land, Mr. Greeley believed the West's lumbermen could be persuaded to replant cutover lands, if something could first be done to reduce the risk of wildfire. Moreover, he saw clearly the role lumbermen were playing in fulfilling the government's plan for



developing the West's economy. So after he became Forest Service chief in 1920, he championed not just fire prevention but also tax law changes that encouraged reforestation of cutover land. Four years later, on June 6, 1924 Congress ratified the Clarke-McNary Act, institutionalizing fire fighting and reforestation policies that remain in force today. Within months, Weyerhaeuser Timber Company directors formed a new subsidiary, the Weyerhaeuser Logged Off Land Company "to take over, own, control and manage our logged-off land."

In a sense, the 1942 Tree Farm certification meeting at the now long-gone Portland Hotel was re-affirmation of everything W.B. Greeley and Charles S. Long preached during their long years of service to forestry. It closed the door on all that had gone before it — and cracked opened the door leading to forestry's golden age.



World War II was fought with wood: 215 billion board feet in six years. Ten million acres of timber: an amount sufficient to construct 20 million homes, 48 billion board feet for construction of military training camps, factories and shipyards, 43 billion feet for truck bodies [one million feet daily, mainly ash and oak], ammo boxes, packing and crating and ten billion feet for weapons, airplanes, patrol boats and ship parts.

"The war machine was fed with lumber, chiefly by denying it to civilians," Bill Greeley wrote in 1951, four years before his death. And it was true. You could not buy lumber during the war without a War Production Board [WPB] permit. Foresters, loggers and sawmill men were exempt from the draft so long as they stayed at their posts. Colorful WPB posters were everywhere, extolling the men to "Log Like Hell" for the war effort. Indeed, the government became so concerned about log shortages that it sent a nutritionist to Washington's Olympic Peninsula to make certain loggers were getting enough to eat.

Mr. Hagenstein remembers the event well. "His name was Dr. Auchter. We spent three days together on the Olympic Peninsula. He even bought a pair of caulk

boots so he could get around. After watching loggers dragging eight pound mauls, four and a half pound axes, 11-foot crosscut saws, and 40 pounds of steel wedges all day long he went back to Washington, D.C. and ordered double rations of meat for them! Meanwhile the rest of the country got its protein from peanut butter."

The war also opened the door on an era of technological advancement that



Weyerhaeuser's first general manager, George S. Long, on a skid road near Camp 1 southwest of Seattle in 1903.

continues today. Waterproof glue, invented at Aberdeen, Washington in 1933 by Dr. Charles Nevin, became one of the war's single most important strategic materials, bonding the sandwiched-together layers in millions of four-by-eight foot sheets of Douglas fir plywood used in boats, airplanes and pre-fabricated buildings. Astounded by its strength and ease of repair, the National Defense Advisory Commission declared plywood to be critical to the war effort. In retrospect, lamination — gluing together thinly peeled sheets of wood under great heat and pressure — has, along with recent recycling efforts, done more than anything else in history to extend the nation's fiber supply.

But it was the post-war residential

building boom that set forestry on its present day course. Rather than trigger a return to turn-of-the-century over-cutting, as many predicted, post-war demand for lumber caused timber prices to triple, stimulating unprecedented investments in reforestation and research in forest productivity and wood technology. We have not looked back since. In fact, forest growth has exceeded harvest every year since the late 1940s. By 1992, growth exceeded harvest by 34 percent and the volume of forest growth was 360 percent greater than it was in 1920.

Today, the U.S. South is working on its fourth forest, the Northeast its third and the West its second. The fact that America's forests survived the nation's Nineteenth Century transition from agrarian society to industrial giant is a tribute to their resiliency. The fact that their recovery continued, indeed gained great momentum, in the Twentieth Century, despite unprecedented demand for lumber and paper products, is a tribute to science, engineering, enlightened public policy and an army of tree planters employed by the Depression-era Civilian Conservation Corps. But when progress is measured in terms of untapped forest productivity, many scientists believe we have not yet scratched the surface.



"I have two working Bible's in my life. The King James Version ministers to my soul and Westvaco's CFM program ministers to my trees."

Say this for David Hale: he is a master of the proverbial six-second sound bite. He should be. As one half of Knight & Hale, makers of arguably the best turkey call ever invented, he is an icon on the sporting goods show circuit. But in recent years he has also become a Tree Farmer of considerable reputation, which is saying a lot for a guy who spent years crusading against clearcutting in his beloved Kentucky hill country.

"I stopped making decisions in ignorance," Mr. Hale says of his transformation from clearcutting opponent to advocate. "I wanted all the wildlife I could have, but I didn't understand how

to get it. Harvesting is essential.”

Mr. Hale is certainly not the first wildlife lover to hate clearcutting, nor will he be the last. And had it not been for the quiet persistence of a Westvaco Corporation forester he might well still be railing against it, but over time the success of the company’s Cooperative Forest Management [CFM] Program won him over, just as it did his Knight & Hale partner, Harold Knight, who concedes he was “just about as opposed to harvesting trees as you could get.”

“Now I’m constantly on the lookout for places to clearcut,” Mr. Knight says, echoing Mr. Hale’s turnaround. Though he is still not fond of the expansive clearcuts that are central to southern pine forestry, Mr. Knight sees the smaller ones the two men employ in their 2,500-acre hardwood forest as reliable tools for creating and maintaining habitat for deer, wild turkeys and songbirds.

“Before we started working with Westvaco I was convinced we were saving our forests by not harvesting,” he recalls. “I now realize they were dying. The harvesting program Westvaco’s foresters and biologists helped us develop not only saved our forests but also made them better. By concentrating on removal of poor quality trees we’re encouraging growth in a wider variety of trees than I even knew we had. Our forests are more diverse and a lot healthier too. We’re even planting some pine [long considered a mortal sin among the South’s hardwood aficionados] to create winter cover for turkeys, and we’re converting log skidding trails and truck loading areas into feeding zones. It’s wonderful.”

Mr. Knight heartily agrees, noting that until the two men signed a cooperative management agreement with Westvaco he never considered—and would have rejected out of hand—any suggestion that there could be a positive linkage between timber harvesting, forest health and wildlife habitat diversity.

“It is a new twist for me,” he concedes. “I am a convert.”

Mr. Hale often accompanies Westvaco foresters into the woods to help them mark trees for harvest. He also has a close working relationship with his loggers—a father-son duo he clearly admires.

“Our whole program is geared toward removing poor quality trees and leaving the best ones as habitat and as a future seed source,” Mr. Hale explains. “They do a great job for us. Nothing is

harvest some timber in order to meet non-commodity management objectives [in Mr. Hale’s case a desire to maintain open spaces where songbirds and game animals congregate and feed] produces an enormous bounty. In 1997, the most recent year for which public records are available, so-called “non-industrial” timberlands yielded 5.234 billion cubic feet of softwood, 50.4 percent of the nation’s entire softwood harvest, and another 5.426 billion cubic feet of hardwood, 74.6 percent of the total hardwood harvest.

The number of small forestland owners participating in company-sponsored tree improvement programs like Westvaco’s CFM Program is not known, but this one program—the oldest in the country—includes 3,000 landowners. Among them: Time Warner-AOL mogul Ted Turner, now the nation’s largest private landowner and a man many revere for the millions of dollars he has contributed to anti-forestry groups. His investments in forestland clearly underscore the great diversity of management objectives found among the nation’s non-industrial landowners. Of Westvaco’s program and the landowners it now serves in South Carolina, West Virginia, Virginia, Maryland, Kentucky, Tennessee and Pennsylvania, company forest resources public relations manager K.L. “Casey” Canonge says, “Our goal is simply to share our expertise and an ever-expanding body of field research with other landowners who share our commitment to ecosystem-based multiple use forest management.”



Jim Petersen



Jim Petersen

(Top) David Hale spent years crusading against clearcutting, but confesses he is now constantly on the lookout for places to clearcut on his Kentucky Tree Farm. Mr. Hale and partner, Harold Knight, founded Knight & Hale, renowned game call maker.

(Bottom) Father-son team, Dale and Robert Dunning log for Mr. Knight and Mr. Hale.

wasted. I trust them”

For most of the nation’s small forest landowners timber management is a by-product of other more intensely felt interests. Millions share Mr. Hale’s love of wildlife, but for others simply improving the quality and aesthetic beauty of their forests is an all-consuming passion. Even so, their need to periodically



When it comes to field research, it may be that



George Fenn has no equal in all of forestry. Mr. Fenn, 76, is a brilliant physicist with such an insatiable appetite for knowledge that he built his own forestry library at his Fenn Farms office at Elkton, near Roseburg, Oregon.

In the 33 years since he departed southern California's defense industry and an impressive post-war business career, Mr. Fenn has transformed a worn out sheep pasture into one of Oregon's most productive forest plantations. It is by any measure a stunning accomplishment that has made his 390-acre Tree Farm a favored field trip for research scientists and forestry students from nearby Oregon State University. Indeed, this is perhaps the only place in Oregon where you can stand beneath towering Douglas firs that rise from hillsides where Mr. Fenn combined wheat just 20 years ago.

Unlike Mr. Knight and Mr. Hale, whose interests lie in maintaining wildlife habitat, Mr. Fenn is, as he says, "in the business of growing trees for sustainable productivity and economic return." The fact that he does it so well—minus any formal training in forestry—is a tribute to his education as a physicist, his no-nonsense background in guided missile systems and his trademark irreverence for the status quo. When, for example, he discovered that one of his plantations was not growing as fast as others nearby, he rejected the suggestion that there was nothing he could do and instead took tissue samples from seedlings, conducted a worldwide search of relevant scientific literature and concluded the soil lacked sufficient boron and iron. He applied both nutrients. It worked.

"I do not suffer timidity gladly," Mr. Fenn says of his attempts to induce two forestry schools to join him in his research. Both declined noting other government-funded research commitments, so he did it himself—and now shares the results with other landowners and scientists who have come to admire

not only his diligence but also his extraordinary success. "My door is always open," he says. "I'm happy to share what I've learned with anyone who will use the information."

For years West Coast Douglas fir plantations have been the subject of ridicule from environmentalists who see them as little more than biological deserts devoid of species diversity they say can only be found in wild forests. But Mr. Fenn seems to have broken this mold too, planting not just Douglas fir but also

productivity gains—Mr. Fenn has affirmed an important aspect in an already impressive body of scientific knowledge that supports clearcutting of shade intolerant tree species.

"The physiology of shade intolerant tree species, like Douglas fir, larch and ponderosa is fundamentally different from that of shade tolerant species like redwood and grand fir," he explains. "Shade intolerants are capable of extraordinary juvenile growth rates, but if you fail to provide optimum growing conditions,

including early thinning, they never fully recover. By contrast, shade tolerant tree species can be suppressed for years and still exhibit impressive accelerated growth with thinning."

Mr. Fenn harvested his first trees in a 1997 commercial thinning, just 19 years after he planted them. He expects final harvest—meaning the residual crop trees will be removed—in another 12 to 14 years after two more commercial thinnings. Thereafter, the process continues: 500 to 600 genetically superior seedlings will be planted on each harvested acre. Over the 32-year cycle, it will grow at a rate of more than 500 cubic feet per acre per year, four times the annual wood fiber yield of a comparable wild forest, and comparable to forest plantations growing in the Southeast, considered by many to be the best fiber producing region in North America.

In his quest to increase the productivity of his forests, Mr. Fenn has left no stone unturned. And he is passionate about the result, especially when questioned about the sustainability of short-rotation forestry, which relies on tools and techniques many environ-

mentalists consider unsustainable: genetically superior seedlings, fertilizers, herbicides and clearcutting.

"There is no scientific evidence that any aspect of short rotation forestry depletes the soil," he says of an oft-made environmentalist claim. "In Ohio there is a continuous corn crop dating to 1839. A comparison of soil records indicates it is



Jim Petersen



Jim Petersen

(Top) Physicist George Fenn, left, is one of Oregon's most successful and most admired tree farmers. Standing with him in a recently replanted clearcut at his Elkton Tree Farm is reforestation contractor Art Skach, Yoncalla. (Bottom) John Ulrich has turned a ragtag overgrown forest into one of Montana's finest Tree Farms. He was named Montana Tree Farmer of the Year in 1998.

larch, pine, grand fir and redwood on slopes where sheep grazed for decades. Indeed, his planted forests contain more tree species than do many of the region's vast naturally regenerated Douglas fir forests—products of great wildfires that last burned nearly a century ago.

In the course of adding species to his plantations—and researching probable

in better shape now than it once was. Our land productivity is both sustained and sustainable. We acquire the best genetic resources possible, work with the most advanced seedling nurseries, plant, fertilize, control competing vegetation, protect against animal damage, optimize the drainage, protect the streams, avoid erosion and take great care during harvest."

Despite Mr. Fenn's considerable success — perhaps even because of it — he is at odds with third-party forest certification, a controversial-in-some-corners process by which the sustainability of various forest practices is verified by an unbiased third party hired by the landowner. Though considered by many to be too subjective, certification has become increasingly important to major lumber and paper retailers anxious to strengthen buying relationships with their environmentally conscious consumers.

"Certification is a bottomless pit, particularly the Forest Stewardship Council program," he grumbles. "I would never submit to such an audit because their standards do not represent progressive forestry. Were I to apply their standards in my plantations productivity would decline by 75 percent and the cost of our wood products would increase by 400 percent." Indeed, a 1997 financial analysis of Fenn Farms revealed that Mr. Fenn's short rotation regime was returning \$2,600 per acre, compared to a loss of \$674 per acre for longer rotation methods he terms "neglectful forestry, affordable only by tax-supported government entities."

Productivity is no small matter for Mr. Fenn—and generating a respectable return on his considerable investment is for him only half the argument favoring short rotation forestry. The other half involves a rocket scientist's mid-life discovery that he could leave a small patch of earth in better shape than he found it.

"What could possibly be better for the earth than growing, managing and harvesting trees," he retrospectively asks of his 30-plus year sojourn in forestry. "We have transformed a worn out overgrazed sheep pasture into a vibrant Tree Farm, producing not only renewable wood fiber but also myriad growth opportunities for plant and animal species that inhabit the openings harvesting creates. Can anyone doubt the tangible or intrinsic value of our contribution to the environment?"



A thousand miles away in northwest Montana, John Ulrich is tending a different kind of pasture—an overgrown ragtag forest that is the aftermath of a turn-of-the-century high-grading by loggers employed by the old Great Northern Railroad. Mr. Ulrich



Jim Petersen

Loading pulpwood on a Jim Carey Logging Company job on Michigan's Upper Peninsula, not far from Mead Corporation's Escanaba paper mill. Highly mechanized logging systems are commonplace in the Great Lakes region.

intends to restore it—and after nearly 30 years the result of his backbreaking effort is beginning to show. Sunlight illuminates thousands of waist-high saplings growing beneath towering residual trees Great Northern loggers passed up because they were then too small. Punctuated by brightly colored wildflowers and bits of nutrient-rich logging debris this rescued forest is indeed an impressive site.

"Essentially, we are engaged in a long-term thinning program," Mr. Ulrich says of his 306-acre work in progress. "By harvesting only the poorest quality trees, we're encouraging quality natural

regeneration in larch, ponderosa pine, Douglas fir, spruce, lodgepole and alpine and white fir. Eventually this forest will take on the visual and biological characteristics of the one that grew here before the first loggers came through."

What may be most remarkable about Mr. Ulrich's work is that it provides a blueprint the Forest Service would like very much to replicate in its adjacent Flathead National Forest, if only Congress would approve the work.

Having worked for the Forest Service for 23 years, including a six-year tour as Flathead timber manager, Mr. Ulrich has some sympathy for the agency's plight, though he is not fond of the clearcut that now sits squarely in the across-the-canyon view from his house.

"Clearcutting can be an effective forest regeneration tool, but the current lack of experience in timber sale layout really shows in this one."

Mr. Ulrich acquired his first acreage here in the late 1960s when he was still with the Forest Service, then added to it as adjacent parcels went up for sale. He thinned his stands by hand for nearly 20 years before contracting with Floyd Quiram, one of the area's most admired loggers. Using a cut-to-length mechanical harvester capable of efficiently removing single trees without damaging the residual stand, Mr. Quiram has thus far thinned about 120 acres to a spacing that Mr. Ulrich believes is sufficient to promote both growth and successful natural regeneration "Considering the condition of this forest before we started, we've made remarkable progress."

His peers would seem to agree. Three years ago, and just 18 years after his Tree Farm was certified, Mr. Ulrich was named Montana Tree Farmer of the Year. And while

his forest will never be a big timber producer, it has, like Mr. Fenn's, become a must stop for scientists and others studying techniques for improving forest health and productivity.

"The potential here in northwest Montana is huge, not just on federal lands, but also on smaller private tracts," he says. "Those of us who understand this potential—and the risks associated with neglect—need to elevate the forestry discussion in as many ways as we can. I am doing it by creating a real-world example others can follow."



# 6 THE BOUNTIFUL HARVEST

World War II was not the first war fought with wood. The Civil War was—and there-after World War I. The two wars and the rise of the Industrial Revolution took a terrible toll in forests east of the Mississippi, though today it is virtually impossible to find evidence of the devastation that occurred between 1850 and 1920. But hidden away in a magnificent hardwood forest near Chillicothe in southern Ohio are the last remnants of Vinton Furnace, a colossus that smelted pig iron from 1854 to 1883. Historians believe the iron cladding on the Union Navy's warship Monitor came from Vinton area furnaces.

Iron making was a backbreaking task requiring iron ore, limestone and charcoal. Once ax-wielding laborers had stripped the trees from the area's low rolling hills, German and Polish immigrants dug out the iron and limestone by hand. Trees were piled haystack fashion, covered with mud and set afire. Inside oxygen deficient mud-hut ovens, the wood charred but did not burn. The recipe for one ton of pig iron was straightforward: to 200 bushels of charcoal add 5,000 pounds of ore and 300 pounds of limestone. The average furnace produced eight to 12 tons of pig iron daily. It took 350 acres of timber to support one furnace for a year. There were 46 blast furnaces in the region's forests.

For economic reasons, Vinton Furnace was converted from charcoal to coal in 1868. And up the hill behind the furnace the remains of 24 ovens bear silent witness to what happened here. They were imported from Belgium in 1875 and assembled on site to convert coal to coke. Now trees tower over them as if holding them hostage.

Forty-four houses, a store and

schoolhouse once had a clear view of the furnace from across a nearby stream. But they too are gone now, overtaken by trees so thick it is difficult to see anything from more than 50 yards away. In fact, unless you know the trail leading to it, you cannot find Vinton Furnace today. Call it nature's vindication if you like, but what stands here today is the Vinton Furnace Experimental Forest, a 1,200-acre research site created for Forest Service use in 1952 by the Baker Wood Preserving Company. The Mead Corporation bought

ash, cherry and walnut, 50 years of research lights the way for any landowner interested in learning how to be a better steward of his forest. Eleven different plots illustrate the forest's reaction to thinning and harvesting techniques accentuating seemingly conflicting values: maximum growth in commercially valuable species, natural regeneration, species composition, wildlife habitat management and visual quality. But what is most amazing about the plots, which lie adjacent to one another in this living

laboratory, is that they do not conflict, but rather complement one another quite nicely. There are sun-filled openings, evidence of recent thinning activity, heavily shaded stands untouched for 20 or more years, areas thinned to promote plants favored by deer, turkeys and squirrels and clearcuts where commercially valuable poplar, cherry and oak quickly re-sprout from subterranean roots.

"It really is pretty remarkable," says Wayne Lashbrook, Mead's forest stewardship manager and the company's Forest Service liaison at Vinton Furnace. "A landowner can come here and study the application and aftermath of 18 different long running harvest and regeneration experiments. You can pick your management objective and see the result already in place."

Mead's Chillicothe operation is a mirror image of the rest of the nation's pulp and paper industry. The mill, which makes several grades of paper, consumes more than one million tons of wood annually—far more than the company's 150,000-acre regional forest can provide. To fill the supply gap, Mead fiber

buyers annually purchase 400,000 tons of chips from 70-some sawmills in southern Ohio, West Virginia and Kentucky, plus another nearly 600,000 tons of pulpwood that are chipped at Chillicothe. To keep the logs coming, the company courts thousands of small timberland owners across the region. And to improve its landowner relationships, the company has



Jim Petersen



Jim Petersen

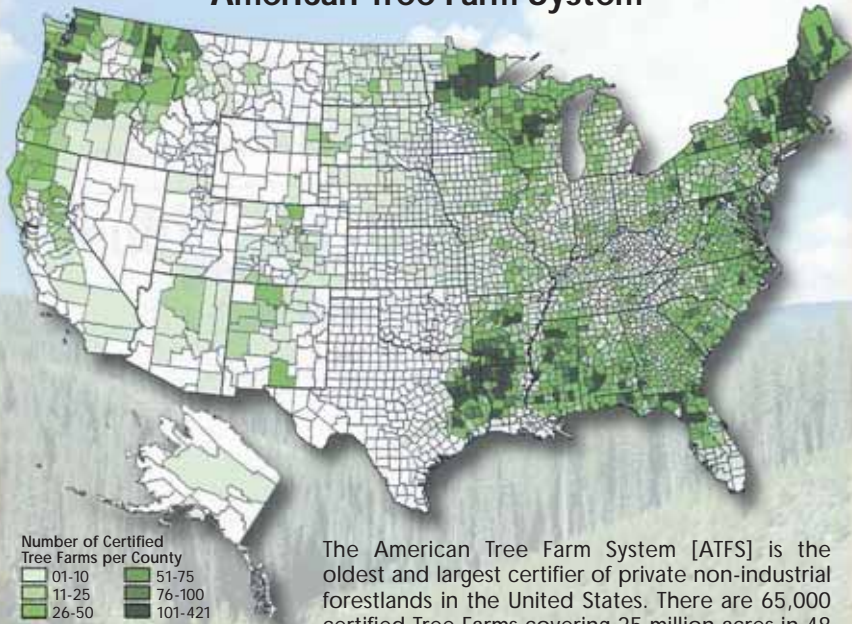
(Top) All that remains of the coke ovens that once fired Vinton Furnace near Chillicothe, Ohio. Originally fired by charcoal, they smelted pig iron from 1854 to 1883. 46 such furnaces in the area each consumed 350 acres of timber a year. (Bottom) Selection harvest unit in the surrounding Vinton Furnace Experimental Forest, a Mead Corporation demonstration forest maintained in concert with the U.S. Forest Service.

the site and 16,000 surrounding acres in 1962 and has maintained the Forest Service relationship since then as part of its effort to improve the quality and productivity of southern Ohio forests that now grow on land cleared for farming after the Civil War.

Here, amid oak, yellow poplar, red maple, blackgum, sassafras, sourwood,



## American Tree Farm System



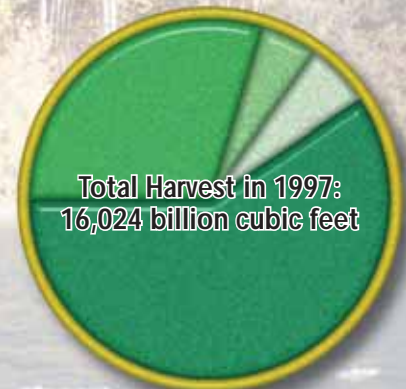
The American Tree Farm System [ATFS] is the oldest and largest certifier of private non-industrial forestlands in the United States. There are 65,000 certified Tree Farms covering 25 million acres in 48 states. ATFS recently retained Price Waterhouse Coopers to lay the groundwork for third party review of its auditing process. [Source: Forest Operations Review and the American Tree Farm System]

## Who Owns America's Forest & Where Does the Harvest Come From?



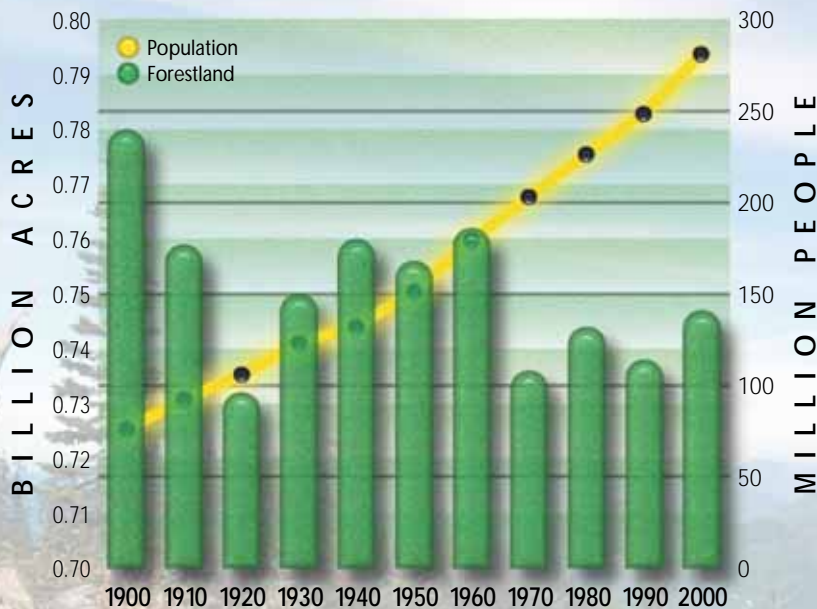
### Acres of Timberland Owned

Non-industrial Private:	290,840,000
Forest Industry:	66,857,000
National Forest:	96,436,000
Other Public:	49,532,000



Private individuals, including members of the American Tree Farm System, own almost 58% of the nation's 503.7 million-acre timberland base and provide nearly 60% of the annual harvest. Forest industry lands are more intensively managed, so while industrial owners own only 13.27% of the U.S. timberland base they account for nearly 30% of annual harvest. By contrast, federally owned National Forests comprise 19.15% of the timberland base but provide a mere 5.17% of the harvest. Other public ownerships account for 9.83% of the timberland base and provide 5.9% of the harvest. "Timberland" is defined as land capable of growing more than 20 cubic feet of industrial wood per acre per year in natural stands. [Source: U.S. Forest Service, Forest Resources of the United States, 1997, Tables 10, 18, 19, 35, 36, 37]

## Historical Trends in U.S. Population & Forestland

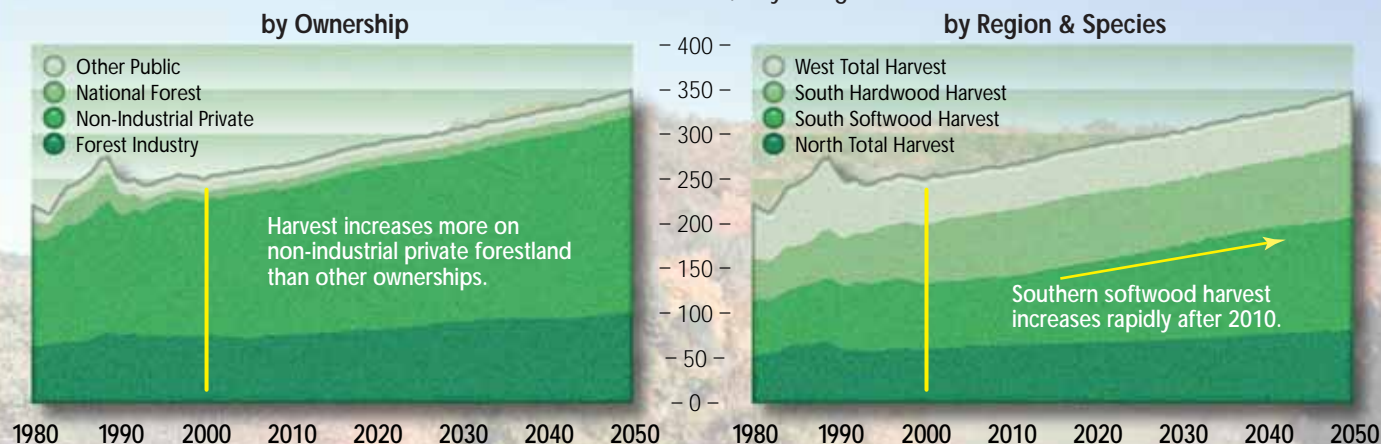


Although the nation's population has more than tripled [from 76.2 million to 281.4 million] since 1900 the nation's forestland base has declined by a mere 4.3% in the same century [from .78 billion acres to .747 billion acres]. Most of the decline is the result of forestland conversion to other uses: agriculture, urbanization and transportation. The fact that the nation's forestland base is so modest despite significant population growth [soaring demand for wood and paper products] is a tribute to advances in forestry and huge private capital investments in increasing per acre forest yield. [Sources: Dr. Con Schallau, Doug MacCleery, USFS: 2000 Resource Planning Act Assessment; and U.S. Census Bureau]



## Projections in Timber Harvest

in millions of tons, dry weight



Although per capital forest product consumption is projected to increase during the first half of this century, per capita roundwood harvesting will remain roughly constant according to U.S. Forest Service research economists Richard Haynes and Peter J. Ince. Projected gains in production process efficiency and paper recycling are expected to yield sufficient additional fiber to meet increased demand for wood fiber. Harvesting will increase more on non-industrial private forestlands (left) than on other ownerships, with the South (right) providing an increasing share of the nation's harvest. [Source: U.S. Forest Service, "2000 RPA Timber Assessment," by Richard Haynes and Peter J. Ince.]

## Sustainable Forestry Initiative® (SFI) Program

### Companies That Have Completed Third-Party Certifications

COMPANY	VERIFIER	DATE CERTIFIED	HECTARES	ACREAGE
Willamette Industries, Inc.	Price, Waterhouse, Coopers	Oct. 1, 1998	689,099	1,702,740
Blandin Paper Company	QMI	Sept. 1, 1999	78,107	193,000
Plum Creek Timber Company, Inc.	Price, Waterhouse, Coopers	Oct. 31, 1999	1,343,773	3,320,418
Boise Cascade Corporation	Price, Waterhouse, Coopers	June 8, 2001	396,606	980,000
Fraser Papers, Inc.	QMI	June 20, 2000	808,040	1,996,640
Stora Enso Consolidated Paper, Inc.	BioForest	July 17, 2000	147,716	365,000
Seven Islands Land Company	Plum Line	Aug. 1, 2000	394,583	975,000
Stimson Lumber Company	Price, Waterhouse, Coopers	Aug. 1, 2000	117,743	290,940
LP	BVQI	Oct. 1, 2000	364,230	900,000
Finch, Pruyn & Company, Inc.	Plum Line	Oct. 1, 2000	67,180	166,000
International Paper Company	BVQI	Nov. 1, 2000	2,954,310	7,300,000
Mead Paper	Price, Waterhouse, Coopers	Nov. 1, 2000	844,817	2,087,513
TimberWest	KPMG	Nov. 1, 2000	331,166	818,300
Weyerhaeuser Company	QMI/Price, Waterhouse, Coopers	Dec. 1, 2000	135,170	334,000
InterFor	KPMG	Dec. 31, 2000	2,913,840	7,200,000
Simpson investment Company	Price, Waterhouse, Coopers	April 20, 2001	184,948	457,000
Georgia-Pacific Corporation	Price, Waterhouse, Coopers	April 27, 2001	0	0
Temple-Inland, Inc.	BVQI	April 27, 2001	852,136	2,105,598
The Pacific Lumber Company	Auther Anderson/Interforest	May 17, 2001	91,058	225,000
Hampton Affiliates	Price, Waterhouse, Coopers	July 30, 2001	72,848	180,000
Sierra-Pacific Industries	KPMG	Aug. 1 2001	607,050	1,500,000
<b>TOTAL</b>			<b>13,394,416</b>	<b>33,097,149</b>

More than 33 million acres of industrial forestland in the U.S. [23.3 million] and Canada [10 million] have completed Sustainable Forestry Initiative [SFI] third party certification. Another 64.3 million acres [24.7 million U.S. and 39.6 million in Canada] are pending. Independent verification of the sustainability of forest practices is critically important to a growing number of lumber and paper wholesalers and retailers, as well as consumers of large amounts of office-related paper products. [Source: American Forest & Paper Assn]

initiated a free landowner assistance program similar to Westvaco's CFM program. Then, to make certain its contract loggers are sensitive to soil and water quality—environmental values easily damaged by reckless use of equipment—Mead imposes two ironclad rules: loggers delivering pulpwood to company wood yards must comply with state safety and environmental standards, and loggers who work on Mead land or company-contracted land must complete additional safety and water quality training at Hocking College in Nelsonville, Ohio.

"Loggers are our interface with small forestland owners," Mr. Lashbrook explains. "We are together responsible to the landowner for the quality of the work we do. And we depend on our loggers to alert us to landowners who need help managing their forests. As a matter of company policy, we encourage landowners to responsibly manage their forests and we buy only from Master Loggers."

Mead, based at Dayton, Ohio, owns another 2.1 million acres of forestland in Alabama, Georgia, Kentucky, Maine, Michigan, Tennessee and New Hampshire. In addition to its Chillicothe operation, it owns paper mills at Escanaba, Michigan, Phenix City, Alabama and Rumford, Maine. All told, the company has offices and operations in 32 countries and sells its products—paper, packaging material, paperboard and office papers—in 98 countries. Annual sales exceed \$4.3 billion and its Mead and Gilbert paper labels are among the most recognizable on office products store shelves around the world.

Mead and its Wall Street-traded competitors—their holdings labeled "Forest Industry Lands" in Forest Service records updated annually since the early 1950s—own just 13 percent of the country's 503.8 million-acre timberland base. But because timber production is emphasized, industrial landowners account for about 38 percent of the nation's softwood harvest [3.965 billion cubic feet in 1997] and about 16 percent of its hardwood harvest [1.141 billion cubic feet in 1997]. Softwood lumber is used mainly as structural framing and sheathing material in houses, while



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The old Crowell Lumber Company mill site at Longleaf, Louisiana is now a fine museum. During World War II the plant milled virgin southern pine used in the construction of the famed Higgins boats like said helped secure peace. Built in 1892, the mill fell silent for the last time on Valentine's Day 1969.

hardwood is used in doors, windows, wood trim, furniture, pallets, newsprint and numerous grades of writing paper. Add all the cellulose-based products made by other industries and you have 5,000-plus necessities of life that were first products of the forest.

But numbers don't tell the whole story. Most of the nation's big landowners maintain cooperative research ventures like Mead-owned Vinton Furnace, and most also have close ties with wildlife groups including the Ruffed Grouse Society, Ducks Unlimited, the National Wild Turkey Federation, the Izaak Walton League of America, the Boone and Crockett Club and the Rocky Mountain Elk Foundation. All require their loggers to complete training programs, most maintain landowner assistance programs, many are involved in sophisticated university-level research in forestry and wood technology and most participate in third-party certification programs designed to assure lumber and paper retailers their forests are sustainably

managed. But standing beneath towering oaks that shadow Vinton Furnace it is comforting to see that here in southern Ohio's beautiful hill country, before forestry made its way from Europe to America, nature faced down the Industrial Revolution and won.



Forestry gets down to business in a hurry in Louisiana today. The great southern pine forests that gave the South its first real shot at the Industrial Revolution are nearly all gone now. Gone too is the region's old lumber milling industry—gone the way of the Crowell Lumber Company at Longleaf. Its saws, installed in 1892, fell silent for the last time on Valentine's Day 1969. Shortly thereafter the town disappeared from state road maps. Sad, because there is a splendid outdoor museum there now to remind passersby that a thousand people once lived in Longleaf, and that Crowell saws cut virgin southern pine logs used to build the famed Higgins assault boats that Ike said helped win World War II.

But what has replaced Louisiana's old forests and its first milling industry is stunning in its own right. In the half of this state that is forested, southern pine plantations stretch as far as the eye can see. Although they are the progeny of earlier natural forests, these forests of loblolly, slash, shortleaf and longleaf pine are growing much faster, yielding nearly four times as much wood per acre per year. Such productivity gains do not come easily, but thanks to advances in genetic research it is now possible to grow a southern pine forest that is ready for harvest in 35 years or less, depending on the desired product. No wonder southern pine is now Louisiana's leading crop.

These new forests bear witness to the rise of an industry that bears little resemblance to its heritage. The old gang saws that cut big logs into lumber are long gone, replaced by state of the art milling technologies that convert small diameter logs into lighter and cheaper-to-assemble "engineered" products whose standards for performance and reliability



far exceed those of earlier generation sawn lumber: glued laminated timbers, I-joists, I-beams and structural composite products including oriented strand board and laminated veneer lumber. And there is this fact that you would think would have conservationists dancing in the streets: it takes only 40 percent as much wood to frame a house when laminated veneer lumber [LVL] is used in place of dimension lumber.

Louisiana is home to the largest LVL manufacturing facility in the world, Boise Cascade Corporation's Alexandria plant.

Together with its slightly smaller sister plant in White City, Oregon, the company now services burgeoning LVL markets on three continents: Europe, Asia and North America. To meet its future fiber needs Boise has also become a leader in southern pine genetic research.

"We are looking for the elite among naturally occurring pollen crosses," says Southern Forest Resources Manager Tom Rhodes of the company's seed tree orchard and its 13 progeny test sites. "Our objective is to increase per acre fiber yield while also increasing the genetic diversity within our plantations."

Boise plants about 12 million seedlings annually on some 15,000 cutover acres. And like other southern forest landowners, it is constantly on the lookout for pines that exhibit exceptional insect and disease resistance, tolerate frost, grow faster and display superior form and structural properties. Seeds extracted from their cones stand a good chance of becoming part of a six-state tree improvement cooperative that provides seedlings grown from millions of naturally occurring genetic crosses.

To maximize tree growth and quality, southern pine forests are typically thinned three times. Boise reduces stand density from 700 to 300 trees per acre at age 14, from 300 to 175 at age 20 and from 175 to 95 at age 26. Thinning No. 1 produces nine cords per acre, No. 2, six cords and No. 3 yields seven cords. Final harvest, between age 30 and 35 yields another 60 cords, but within a few years, genetic

advances will soon push final harvest to age 27 and boost final yield to 75 cords.

By age ten the trees are 20 feet tall and their bark is thick enough to withstand a low intensity ground fire. So to control insects and diseases, and to promote growth in plant species preferred by wildlife, ground fires are thereafter set at three-year intervals until final harvest. Then the process starts anew. The land is cleared, stumps are pulled, piled and burned, the soil is tilled into high-centered rows that allow for drainage and



Before this Boise Cascade clearcut in Louisiana is replanted, bulldozers remove stumps and till the soil, creating rows of mounds in which seedlings will be planted. Ditches between the mounts collect rainwater.

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a new pine crop is planted.

While these new plantations certainly lack the storied past that inspired so many of the Old South's great novelists, the Forest Service expects them to provide nearly 75 percent of the nation's softwood harvest by 2050. Moreover, fast growing pine plantations are expected to blanket nearly 50 million acres of the South by then, 53 percent more area than they cover today. And though some southerners resent the sameness of plantations, the surprising fact is that they also provide abundant wildlife habitat. Boise's forests, which are by no means unique, hold deer, squirrels and rabbits, plus more than 80 bird species including the endangered red-cockaded woodpecker. Southern forest landowners, including Boise, have learned how to work around the bluebird-sized woodpeckers — the only birds in the region that bore cavity-like nests into live pines. Since it can take a woodpecker more than a year to bore a nest-size hole in a live pine,

biologists sometimes lend a hand by boring nesting cavities about 25 feet off the ground. The mature park-like settings the birds prefer stay so because foresters burn them periodically to reduce competition from brush, speeding growth in naturally reseeded saplings. Because the water table in the Southeast is so close to the surface, any appreciable amount of rain can quickly turn a logging job into a mud bog. To alleviate the problem and subsequent erosion, which can impair water quality, heavy logging equipment

traverses the landscape on layers of logs called "mats" or "corduroy roads" because they are ribbed like the fabric. Laid crossway the logs support the weight of machines that would otherwise sink to their axles.

Wherever machines run, there are corduroy roads laid out in street-grid fashion. Once the job is done, the logs are removed and milled. Within a matter of weeks, new vegetation obliterates the roadbed.

Of course, such roads are standard fare for companies participating in the American Forest & Paper Association's Sustainable Forestry Initiative [SFI]. SFI mandates

practices that protect water quality — as does the federal Clean Water Act. And according to Boise's Mr. Rhodes, SFI has become a way of life for company foresters and loggers. "It has changed our mindset," he observes. "We say to ourselves, 'Protecting water quality means that we can keep the mill supplied with logs year-round.' And because the supply flows year-round, the frantic pace of old is gone. We work slower and safer and protect water quality and still get the wood the mills need."

Boise logging contractor, Eddie Ray Havens, verifies Mr. Rhodes' observations in a way only a logger can. "I'm proud to show people the work we do," he says. "There's no soil rutting. You can hardly tell where our machines have been."

Mr. Havens, who started logging with mules more than 50 years ago, now operates the most technologically advanced mechanical harvesters money can buy: powerful machines with steel-reinforced cabs that keep loggers out of

harm's way. Suspended from hydraulic arms, huge disk-shaped saws that spin at thousands of revolutions per minute sever 60-foot-tall trees at ground level in seconds then lay them gently on in the soil. [See "Logging Comes of Age," Page 30]

"It is a much different and far safer business today," says Mr. Havens of his lifetime in logging. "The machines are very expensive [\$500,000 and up] but we

process: forestry's equivalent of an IRS audit.

My fellow travelers represent high profile Boise Cascade customers: Lowes, at 600 stores the nation's second largest home center chain; Marvin, maker of high-end windows and doors; Lanoga, owner of Lumbermen's Building Centers, Spenard Builders Supply, Home Lumber and United Building; Pella, another major window and door manufacturer; and

long enough to say that while customer-conscious retailers are indeed pressuring landowners to get their forests certified, what they fear more than uncertified lumber are environmental activists dressed in Ninja garb rappelling from store rooftops for the amusement of television news crews. In high volume stores working on razor-thin margins such antics can send customers stampeding for the exits, erasing a month's profit



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The future: A tiny southern pine seedling at Boise Cascade's Evans See Tree Orchard near DeRidder, Louisiana. In Louisiana the company annually plants 12-15 million seedlings on about 15,000 harvested acres.



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This Boise Cascade southern pine plantation is about 30 years old—and will soon be harvested. In Louisiana the company owns 684,000 acres and operates two plywood mills, a paper mill and a laminated veneer lumber manufacturing plant.



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This red-cockaded woodpecker nest cavity is in a 43-year-old plantation owned by Boise Cascade. The company burns the site annually to maintain the park-like structure biologists say the endangered robin-sized bird prefers.

work year round and our workers' compensation insurance costs are a tenth what they were when we had men on the ground packing chainsaws."

Mr. Havens' crew was felling a 39-year-old slash pine stand the day we caught up with them south of Alexandria. Within weeks the brush was piled and burned, the soil tilled and the 20-acre site replanted. Now, barely a year later, a knee-high forest of seedlings—the elite—is pushing its way skyward.

ENAP, operator of 349 east coast lumber yards.

McStain Enterprises, a major Colorado homebuilder, has also sent a representative, its director of environmental programs. Over lunch this day she will tell me that homebuilders from coast to coast are polishing their environmental credentials for the day when many expect most homebuyers will ask if the wood used to build their new homes came from sustainably managed forests. So far few have.

The fact that we have all traveled so far to be here this morning attests to a second fact: forest certification is forestry's biggest story today. A third fact—Boise Cascade's willingness to allow us to observe the process first hand and uncensored—underscores a fourth fact: the nation's major industrial timberland owners see third party certification as the best way to quell consumer concern for the sustainability of their forest management practices. But also on this day a retailer will take me into his confidence

in a single day.

Marquee scientists from three major universities—Oregon State, Montana State the University of Idaho—are conducting today's field audit under contract to PricewaterhouseCoopers, one of the world's largest management consulting firms. The company's auditing roots run deep in both forestry and forest products manufacturing.

Last night we sat through an hour-long orientation designed to acquaint us with the certification process. We learned that Day 1 was devoted to a random search of company forestry records. Anything in the filing cabinet is fair game. Day 2 was spent interviewing foresters, logging engineers, silviculturists and reforestation specialists. Three-hour interviews are commonplace. "It is like taking off all your clothes at a public beach," a company forester tells me later. Today's field audit is a reality check. Does what the certification team sees on the ground mirror what they learned on Day 1 and 2? We will know at the end of the day.



It is five o'clock in the morning. Day 3 of a certification tour of forestry operations on Boise Cascade Corporation timberlands near La Grande, an eastern Oregon timber and farming community, is about to begin. I am one of 17 guests invited to observe the



Midway through Day 2 the team announced it was rejecting the three sites the audit firm had selected for today's field audit in favor of three new locations. I ask why and am told that certification teams view unanticipated scheduling changes as a way of enhancing the credibility of their audits. "The company had time to prepare for the first three sites," explains Price, Waterhouse, Coopers audit manager Bruce Eaket. "They had no time to prepare for the alternate sites we selected at the last moment. We like it that way."

Third party audits take from four to nine days and can cost well over \$100,000, depending on the size of the forest. The landowner pays—a fact that raises conflict of interest questions in the minds of many including a retailer attending last night's briefing. But when someone asks if any retailer in the room would be willing to pick up the tab no hands go up. Retailers are no more interested in paying for certified "green" lumber than are their customers, so Boise eats the cost—as do other major lumber producers. It is a cost of doing business with lumber retailers who have become targets of Ninja imitators.

Three more eminent scientists will join us this morning. Jack Ward Thomas, Chief Emeritus of the U.S. Forest Service and now Boone & Crocket wildlife professor at the University of Montana; hydrologist David Thorud, Professor and Dean Emeritus, University of Washington College of Forest Resources and wildlife biologist Steve Mealey, another Forest Service veteran and one of the country's most respected grizzly bear experts. Now retired, Dr. Mealey recently joined the company as its manager for watersheds, wildlife and aquatic ecology. Doctors Thorud and Thomas consult with Dr. Mealey and other company scientists responsible for implementing whatever recommendations the certification team makes in its final report.

Certification is serious business and

failure is not an option, especially in the presence of customers who account for more than \$100 million in annual lumber and engineered wood product sales. But this day proves uneventful. Some minor suggestions are offered [they always are] and it is off to Minnesota, where the company's pine and aspen forests underwent certification in late August.

If anyone had told me ten years ago that the country's industrial timberland owners would someday open their forests to this kind of scrutiny I would have said they were crazy. And I would have been



Jim Petersen



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Protecting soil and water quality from equipment-related impacts is a requirement of both the federal Clean Water Act, several state forest practices acts and the American Forest and Paper Association Sustainable Forestry Initiative [SFI]. "Corduroy roads" (Top) and all weather, all season bridges (Bottom) are common on industrial forestland across the U.S. These photos were taken on Westvaco land in South Carolina and West Virginia.

wrong. At this writing, some 33 million acres of industrial timberland in the U.S. and Canada will have been third party certified in accordance with Sustainable Forestry Initiative [SFI] standards developed by scientists and landowners working under the aegis of the American Forest & Paper Association.

There are more than 80 forest certification systems in place around the world. Most are small and have no presence in the United States. Here, three systems are at the forefront: the venerable American Tree Farm program established in 1941; SFI, established in 1993 and the Forest Stewardship Council's FSC program, established in 1994. Despite the fact that both SFI and the Tree Farm program dwarf FSC, it is FSC that gets most of the publicity, first because it was established by a coalition of environmental organizations, and second because of its close ties

to the Rainforest Action Network [RAN], marketer of Ninja look-alikes. RAN is an FSC member—a fact many suspect played heavily in recent decisions by Lowes and Home Depot to review earlier commitments to favor FSC-certified lumber over SFI certified products.

FSC's high profile marketing program, which has included advertisements in *Playboy* and *People* (featuring those well known forestry luminaries Pierce Brosnan and Olivia Newton John), has turned certification into something of a political sideshow—a fact that has not gone unnoticed among serious participants. (See "Certification Wars: Why SFI Will Win" at this web-site: [www.evergreenmagazine.com](http://www.evergreenmagazine.com)). In fact, to ward off any appearance of impropriety AF&PA (whose members own industrial timberland or manufacturing facilities) has created a separate non-profit corporation—with a separate board of directors that includes representatives from several conservation groups—to administer SFI's standards and measures. Among them: the Isaac Walton League, The Nature Conservancy, Conservation International and the Conservation Fund. And

among those who applaud the move: Boise SFI advisors Jack Ward Thomas and David Thorud.

"Distancing SFI from AF&PA member landowners is one of two keys to the program's success," Dr. Thomas said in a recent *Evergreen* interview. "The other is independent third-party verification of

the sustainability of forest practices. SFI is a solid program and a very creative solution to problems associated with a public perception that industrial landowners aren't practicing sustainable forestry." Dr. Thorud concurs.

"Third party certification puts forestry back in the forest where it belongs, distancing it from legislative and policy processes," he told me during a LaGrande interview. "It assigns a much higher priority to environmental goals, thereby commanding the unprecedented attention of top industry executives. And it has created a nice bridge linking the common interests of industrial landowners and conservationists."

Dr. Thorud, who also sits on SFI's Sustainable Forestry Board, credits environmentalists with turning certification into a marketplace issue. "It is their contribution to a worthwhile process," he says. "In the years before third-party certification came along landowners never got credit for protecting fish and wildlife habitat, soil productivity and water quality. Now they do."

vulcanologist David Johnston was incinerated.

The force of the blast blew the bulge across sparkling Spirit Lake at 100 miles an hour, transforming its blue waters into a 300-foot high tsunami. The entire lake crashed into the forest on its north shore, then fell back on itself carrying millions of tons of debris. The lake's cabins and lodges were swept to the bottom of the lake and now lie beneath hundreds of feet of mud and debris. Twenty-one years later, logs, trees and stumps still bob gently in shoreline

railroad tracks and industrial sites—were swept away.

In all, 57 people lost their lives, together with 5,000 black-tail deer, 1,500 Roosevelt elk, 200 black bear, 15 mountain goats and countless millions of songbirds, small mammals, salmon and steelhead. Nearly 234 square miles of timber were flattened by the blast, including almost 106 square miles of the Weyerhaeuser Company's St. Helens Tree Farm. Huge trees, some over 250 tall and six feet in diameter, were snapped like wooden matchsticks. Those that were not

toppled by the force of the blast were ripped from the ground. Like spent missiles, they fell back to earth on the backsides of surrounding ridges. The thought of anything surviving seemed unthinkable.

To the casual observer, the blast zone does not look much different today than it did 21 summers ago. But scientists have been surprised by the relative speed of a recovery they feared might take centuries. Where inhospitable ash was washed away by erosion, hundreds of plant species, including wildflowers, punctuate an otherwise grayish moonscape once covered by heavy timber. The birds, frogs and salamanders came back too, as did the elk and coho salmon, both of which proved far more adaptable to greatly altered habitats than biologists had predicted. But it will still be a century or more before a conifer forest is seen here again.

In 1982 Congress established the 110,000-acre Mount St. Helens National Volcanic Monument, commemorating both the blast and nature's early attempts to put the pieces of a once great forest

back together again. The desolate landscape radiates its own beauty, providing scientists with a ringside seat from which to observe the recovery. Nearly 12 million tourists come here every year to gaze at this spectacle and [one supposes] try to figure out where they might have taken cover. But there



Jim Petersen



Mike McMurray

Clearcutting is the forest regeneration tool of choice in shade intolerant Douglas fir forests in western Oregon and Washington. But state-mandated riparian buffers, where harvesting is forbidden, protect fish-bearing rivers and streams throughout the region. The recent clearcut (Top) is on Willamette Industries' timberland west of Salem, Oregon and the riparian zone (Bottom) is on Boise Cascade timberland, also west of Salem.

waters. There is not a tree in sight.

The accompanying earthquake triggered a debris torrent that swept down the Toutle River with such force that it eventually blocked ship traffic on the Columbia River at its confluence with the Cowlitz. Everything in its path—homes, roads, bridges, machinery,



At 8:32 a.m. on Sunday, May 18, 1980 a primeval force up from the basement of time decapitated the crown jewel of southwest Washington's Cascade mountain range. In a single killing moment, more than a cubic mile of Mount St. Helens' splendor rocketed into the heavens. It would fall back to earth as ashen powder in communities as far away as Kellogg, Idaho, 400 miles to the east.

The lateral blast, which moved across a heavily timbered landscape at more than 400 miles an hour, smashed everything in its path. Within 17 miles of ground zero, 700 degree winds blew at 100-miles an hour. A 60-ton log loader was tossed 1,100 feet through the air and torn to smithereens. Standing on the volcano's bulging north flank,



was no place to hide, so it is to Weyerhaeuser's adjacent St. Helens Tree Farm that visitors often retreat in their imaginary flight to safety. In fact, many confuse it with the Monument and, until told otherwise, seem to want to credit nature for the stunning forest they see.

But it is Weyerhaeuser that deserves the credit, for here, on company land, more than 18 million Douglas and noble fir seedlings were planted amid a two-year salvage logging operation that yielded 850 million board feet of timber, enough to construct 85,000 three-bedroom homes.

Most of the trees were hand planted, and in nearly every case, planters had to dig through nearly a foot of ash to reach nutrient-rich mineral soil. Today, the trees are 60 feet tall. No wonder the tourists get confused.

The rapid recovery of plant and animal species is especially noteworthy on company lands because it had been widely assumed [and still is in some quarters] that salvaging timber in the aftermath of such a devastating natural occurrence would only make things worse. But that has not turned out to be the case. Despite the near frenetic pace of the salvage operation, 90 wildlife species, including elk, birds and amphibians, were observed repopulating the area by September 1981. Within five years elk population numbers had returned to pre-eruption levels. Moreover, spawning steelhead numbers in the devastated south fork of the Toutle River where higher than those for streams unaffected by the eruption. This despite presumed fatal high stream temperatures, scoured pools and a near total loss of riparian habitat.

Perhaps no scientist was more surprised by the speed of the recovery than University of Washington forest ecologist Dr. Jerry Franklin, who early on predicted it would be centuries before significant recovery occurred. "It was a stupid perspective," he conceded in an

MSNBC interview conducted on the twentieth anniversary of the eruption. Dr. Franklin stepped out of a helicopter into ankle-deep ash just two weeks after the 1980 eruption. "I expected to find nothing alive but was instead greeted by a recovery already underway. How could I have been so dumb?"

But Dr. Franklin was far from alone in fearing the worst. Many also predicted recent clearcuts would be the last areas to recover, when in fact they were the first. The reason: plants that quickly colonized

that fateful May morning in 1980. It spent another \$10 million replanting and \$1 million monitoring the result. Of course, the cynics will argue that the only reason the company did it is because they are a big outfit and can afford it, and that is certainly true of the world's largest softwood lumber producer, engineered wood manufacturer and owner of standing softwood inventory. But I will argue that they did it because 25 years hence the return of shareholder capital on these immensely productive acres will

be huge. Meanwhile, more than 130 wildlife species thrive here. And to the 18.4 million Douglas and noble fir seedlings the company planted, nature added millions more red alder, cherry, cascara, cottonwood, big-leaf maple and Western flowering dogwood. It is a sight to behold.



The 1980 eruption of Mount St. Helens teaches two great ecological lessons. First, nature is resilient, not fragile as some suggest; and second, armed with the right tools, people can help speed the recovery process. St. Helens the Tree Farm and St. Helens the Monument teach these lessons as studies in contrast that could not be more sharply defined: 106 square miles of 60-foot-tall trees standing beside 128 square miles of near desolation.

But hidden beneath these sharp contrasts is another even more important lesson: where nature is concerned nothing is ever as simple as it first appears. There is, for example, the temptation to see St.

Helens as a ringing endorsement for clear-cutting. And why not: here we have a 234-mile clearcut, punctuated by 106 square miles of pretty good evidence that picking up the pieces and replanting works.

But the lesson taught here is far more subtle and, for landowners, far more



The once sparkling blue waters of Spirit Lake were transformed into a 300-foot high tsunami by the force of the St. Helens' blast. **(Top)** Twenty-one years later logs, trees and stumps still fill the lake. The Weyerhaeuser Company lost 106 square miles of timber and spent two years salvaging 850 million board feet of timber. **(Bottom)** Salvage loggers retrieved enough blast-killed timber to construct 85,000 three-bedroom homes.

clearcuts provided an unexpected measure of resiliency as well as a ready seed source, and mineral soil exposed by erosion or logging equipment provided a nutrient-rich seedbed unavailable in nitrogen deficient ash.

Weyerhaeuser lost \$66 million in timber, plantations and equipment on

valuable. And, like the mountain's disgorged remains, the sometimes contradictory evidence is scattered across an academic landscape that stretches back to the 1930s when clearcutting became the focal point of a scientific debate of near epic proportion. On one side: Leo Isaac, a brilliant silviculturist with the Forest Service's Pacific Northwest Forest and Range Experiment Station and his boss, Thornton Munger, a Yale man and ramrod straight administrator. On the other side: Burt Kirkland and Axel Brandstrom, two University of Washington scientists who, during the Depression, suggested that the Forest Service consider partial cutting in the region's old growth forests as a means of reducing logging costs. Cash-strapped loggers could [they reasoned] take out the larger more valuable trees leaving the smaller ones behind. The idea caught on quickly with those who saw partial cutting as a visually attractive alternative to clearcutting. But Mr. Isaac saw partial cutting as nothing more than high grading, a scheme lacking scientific basis "dreamed up in smoke-filled offices at the University of Washington." The fight was on.

In the end, politics trumped science. The Kirkland-Brandstrom paper was published in 1936, complete with a glowing forward by Forest Service chief, Ferdinand Silcox. And so for the next 20 years the federal government flirted with partial cutting in Pacific Northwest national forests, despite Mr. Munger's well-publicized speech before the Puget Sound Section of the Society of American Foresters—a speech in which he castigated partial cutting as a system "which took out the finest trees and left the rest as sub-standard forest which would predominate in all future growth." Reciting an axiom known to generations of German foresters he declared, "The selection forest must not become the plunder forest."

Jim Petersen



Jim Petersen



Replanting Douglas and noble fir seedlings in the aftermath of St. Helens' salvage logging proved more difficult than Weyerhaeuser scientists had anticipated. For most of the 18 million seedlings planted, planters had to dig through a foot of ash (Top) to reach nutrient-rich mineral soil. (Bottom) Today the trees tower 60 feet above the very spot where the shovel-full of ash was photographed. Thinning is next.

But it would be 1956 before the partial cutting experiment crash-landed in the wake of Mr. Isaac's analysis of the results. Subsequent mortality exceeded growth in 15 of 17 plots he monitored. Residual trees frequently blew over in strong coastal windstorms while others were damaged by equipment that loggers had difficulty maneuvering between designated leave trees. Growth was further impaired by the absence of middle-aged Douglas fir trees poised to take the places of the towering giants that were removed. Worse yet, partial cutting altered species composition, favoring growth in less valuable shade tolerant tree species including hemlock, cedar and silver fir.

"The results of this study, on the whole, provide further proof of the accepted hypothesis that a [shade] intolerant tree like Douglas fir is unsuited for a selection cutting that continuously harvests the oldest and

ripest trees in an all-aged forest," he wrote in what for must have been a moment of considerable vindication.

But Leo Isaac was a far more careful observer of nature than he is now given credit for having been. Despite his ardent defense of clearcutting, he clearly understood its limitations, and acknowledged them in his 1956 paper.

"Individual tree selection or even shelterwood cutting may have a place in some of the abnormal stands or sites in this region," he wrote. "Douglas fir occurs in pure stands or in mixture with ponderosa pine and other species in a somewhat all-aged forest on dry sites. In these stands east of the Cascade Range and to some extent in southwest Oregon and on severe sites within the region proper, moisture is the limiting factor. These stands are short, wind-firm and somewhat open; they let in enough light for some Douglas fir reproduction to become established and grow. Sample plots were not located in these stands in this study, but partial cutting or true selection cutting in these

stands was practiced with success east of the Cascade Range before this project began. There seems to be no logical reason why it would not be equally successful on the drier sites of southwest Oregon, the loose, gravelly soils of the Puget Sound region, or on severe south slopes elsewhere within the Douglas fir region."

Over the years since his "Research Paper No. 16" [Place of Partial Cutting in Old Growth Stands of the Douglas Fir Region] was published, Mr. Isaac's work has been both praised and criticized, but in his determination to overcome the emotional forces that often swirl about clearcutting he lit the way for legions of researchers who have since been obliged to defend the controversial practice in the face of political opportunists and others for whom defending the environment has become chic.

In a 1996 paper he wrote for Policy



Options, ["Biodiversity And Its Relationship To Ecosystem Health and Integrity"] University of British Columbia Professor Hamish Kimmins used some of their own terminology to remind environmentalists that biological diversity cannot be protected by one-size-fits-all regulatory regimes that ignore observable or desired forest conditions.

"Much has been said in the environmental debate about 'respect for nature'," he wrote. "However, there is frequent confusion about what this term means and how we should conduct forestry in order to respect nature. This is because there are two major different meanings in this word. One is to have 'due regard for' or 'to take particular notice' of the object of respect. Another is to 'esteem' or 'venerate' the object. Many of the mythologies about ecosystem diversity, health and integrity are based on the latter definition. Successful sustainable resource management must be based on the former."

To drive home his point, Professor Kimmins stressed the importance of selecting a harvesting system [clearcutting, shelterwood, seed or single tree] that replaces the effects of natural processes management has somehow altered.

"In those forests where natural disturbance that is typical for the desired seral stage [condition] is characteristically small scale and frequent, forest management should emulate this," he wrote. "Where natural disturbance is severe, large scale and infrequent, management should have the same characteristics if it is the objective to sustain the historical condition of the forest."

Bottom line: where disturbance patterns are subtle and hard to detect, avoid clearcutting, leaving some trees behind as a natural seed sources and to shade the new seedlings, just as Leo Isaac suggested. But where nature clearcuts, clearcut for best regeneration results.

The Oregon Forest Resources Institute [OFRI] expanded on Professor Kimmins' work in a 1999 report, "Harvesting and Regeneration in Oregon's Commercial Forests," a report it prepared in the aftermath of Measure 64, a 1998 voter initiative that, had it passed, would have outlawed clearcutting in all Oregon forests, including those that are privately owned. Voters defeated the



Jim Petersen



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(Top) Privately owned forests across the U.S. often contain more genetic diversity than naturally regenerated National Forests. To improve tree quality and protect their forests from disease landowners test different genetic strains in orchards like this one in Louisiana. (Bottom) Soil productivity is naturally enriched by nutrient laden logging debris left behind to rot and return to the soil.

measure by an 81-19 margin after it became apparent to them that private forests in Oregon were already well regulated and in far better condition than the measure's sponsors had alleged. The OFRI report, which drew its points from the work of more than 50 scientists, came to essentially the same conclusions Mr. Isaac drew in 1956. Clearcutting remains "the system of choice," OFRI reported, but Douglas-fir can be successfully regenerated using aesthetically more pleasing selection harvesting methods, particularly on drier sites; while on

wetter sites, landowners face the likely prospect of economic loss, a result of increased seedling mortality and slower tree growth.

In recent years, clearcutting opponents have stepped up their attacks on the practice, claiming that it hurts wildlife; but again, there is scant scientific evidence to support the claim. Two notable reviews of more than 500 studies — one commissioned by OFRI in 1997 and a second completed at Clemson University in 1999 — drew the same conclusion: done properly, clearcut logging benefits plant and animal species that thrive in sun-filled openings.

Writing in the OFRI study, ["Likely Consequences of Forest Management on Terrestrial, Forest-Dwelling Vertebrates in Oregon"] University of British Columbia forest ecologist Dr. Fred Bunnell said he could find "no evidence that current forest practices immediately threaten any terrestrial vertebrate species in Oregon." Nor did he find notable evidence that harvesting was leading to forest fragmentation, a frequent problem neotropical birds in areas where forests join agricultural or urban areas.

Dr. Bunnell considered nearly 300 native vertebrate species that dwell on private lands in Oregon and concluded that because vertebrates have diverse styles "the worst possible approach to maintaining vertebrate diversity would be to manage every acre in the same way, or to have a large forest of a single age class."

The only noticeable deficiency Dr. Bunnell could find in Oregon's most intensively managed forests was a lack of large wood debris — a not surprising discovery given the fact that, for years, landowners were required to dispose of logging debris, even naturally occurring

debris that found its way into streams. But in recent years, fish and wildlife biologists have reversed themselves, and in compliance with new regulations, landowners are now leaving more debris and snags as habitat for small mammals, amphibians and cavity-nesting birds.

The Clemson study [Responses of Wildlife to Clearcutting and Associated Treatments in the Eastern United States] reviewed 230 studies by five federal agencies and 27 universities and came to many of the same conclusions Dr. Bunnell reached. Snags are an important

habitat component, as is woody debris, but clearcutting seems to enhance the quality, quantity and availability of food and cover for a surprising number of species including deer, moose, black bear, rabbits, most game birds, many songbirds and numerous rodent species. The study got an unexpected boost in late 1999 from the prestigious Wildlife Management Institute. In a copyrighted Associated Press story, WMI senior scientist James Woehr challenged the oft-made claim that logging in National Forests hurts wildlife. "The public has this misconception that the proper way to manage for wildlife is to leave the forest alone, but that's just not true," he said. "Where we have excluded natural forces like fire that would create young forests, we have to do something else, and that's cut trees. Currently, several bird species are in decline in the East because there has been insufficient harvesting activity to create the young forest habitat they need to survive."

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(Top) A Weyerhaeuser log truck moves slowly out of a fresh clearcut on the company's St. Helens Tree Farm in southwest Washington. (Bottom) Greenpeace co-founder Patrick Moore, a Ph.D. forest ecologist and author, is a passionate supporter of variable retention harvesting, a widely used clearcutting refinement that retains habitat features biologists believe are important to most vertebrate species.

who grow up in cities.

"We didn't call them 'clearcuts' because the word wasn't known," he remembers. "It was simply an 'opening' or the 'slash.' The slash was a better place to play than the deep dark of the old growth surrounding us. It was brighter, and when the sun shone it was warmer and drier. You could sit on a stump in the sun and all summer long the berries grew; first salmon berries, then thimbleberries, then huckleberries and finally the salal berries. They were all deliciously different and we shared them with

birds, deer and bears. As time went on new trees came up and added year-round green to the logged area. Hemlocks, cedars and firs competing for the sunlight eventually crowded out the berry bushes. It was time to move on to a more recent clearcut."

With such powerful memories to draw on, it's no surprise that in two well publicized books, *Green Spirit* and *Trees Are The Answer*, perhaps hundreds of speeches, and now on his website, [www.greenspirit.com](http://www.greenspirit.com), Dr. Moore goes to great pains to compare and contrast meadows and clearcuts—the "temporary meadows" of his boyhood.

"What clearcuts lack in ease of passage compared to natural meadows they more than make up for in ecological terms," he explains. "The woody debris itself adds a dimension not present in the flat, two-dimensional world of the meadow. Wood left behind in clearcuts offers habitat for a myriad of species, from insects to fungi, to liverworts and mosses. Small mammals can hide from birds of prey beneath decaying branches and find protection from the rain there. Rotting wood is like a slow-release fertilizer, the larger the piece the longer it will provide nutrients to a growing forest. Wood soaks up water like a sponge, holds it over dry periods, and protects the soil from wind and sun."

In his books and speeches, Dr. Moore often references walks through forests clearcut by his grandfather more than 60 years ago.

"If it weren't for the presence of rotting, moss-covered stumps you would never know it had once been cleared," he recalled in 1997 testimony before a U.S. House of Representatives subcommittee. "The new forest is so lush and full of shrubs and trees that all evidence of disturbance has been removed. Bears, wolves, cougars, ravens and all the other forest-dwellers roam there. The trees are straight and tall and although they have not yet reached the great size of some of their predecessors they form a dense and growing cover on land once cleared bare."

Imbedded in Dr. Moore's personal story is an impossible-to-ignore



In what novelist Ivan Doig (*This House of Sky and English Creek*) once called "the murky annals of clearcutting" no one has mounted a more unexpected or spirited defense of clearcutting than high profile Greenpeace co-founder Patrick Moore.

Dr. Moore [yes, he holds a PhD in forest ecology] burst onto forestry's stage about ten years ago and has since become the darling of nearly every forestry industry venue in the U.S., Canada and Europe. The fact that he is a gifted writer in a field not known for its writers has helped, but it is his Greenpeace legacy that has brought him so much new attention, especially from journalists who have simply assumed that an anti-war activist of such renown would automatically oppose logging. Not so, for Patrick Moore is the son and grandson of British Columbia loggers. He grew up exploring fields of stumps. They were his playgrounds, just as certainly as neighborhood ball fields fill the same longing in kids



message for which there is a huge and growing body of scientific evidence: biological diversity need not be lost in managed forests. Forests, he says, can be purposefully managed to resemble their predecessors in species composition and structure.

"Extreme environmentalists like to promote the idea that once a forest is cut the ecosystem is destroyed forever," he said in a February 2000 *Evergreen* interview. "But with very few exceptions second growth forests in British Columbia and the Pacific Northwest are composed entirely of the native tree and plant species. They are as similar to their predecessors as any forest in any region of the world."

In his work with forest land-owners Dr. Moore frequently champions variable retention harvesting, a clearcutting refinement that he helped develop that emphasizes retention of habitat features biologists believe are important to vertebrate species. The presence of such species is an indicator of the overall diversity of a forest, which in turn is considered to be a measure of its ability to quickly recover from the effects of human or natural disturbance. "Where sufficient habitat is retained in the landscape it should be possible to maintain viable populations of each species," he explains.

But it is Patrick Moore's engaging manner, and his more hopeful view of the world, not his PhD in forest ecology, that is scoring big points with urban audiences that love wood but hate stumps. His two books have become enormously popular study guides for people who are trying to understand their place in a natural world about which they know very little.

"Extremists claim that we humans are a cancer on the earth," he observes. "By contrast, forest ecology teaches that we are all part of nature and all life forms change through time. It strikes a balance between human and non-human interests, between reason and emotion. We cannot deny that we must consume to survive any more than we can deny that over-consumption would lead to our demise. Absolutist approaches based on simplistic dogma compromise our ability to steer a sustainable course."

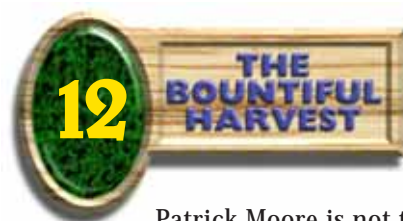
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(Top) South Carolina logger Jimmy Smith is a strong supporter of sustainable forestry. Of Westvaco's commitment to SFI standards he says, "The benefits totally outweigh the costs. I would not go back to the old days." (Bottom) Westvaco honors its SFI commitment in myriad ways. On its 3,400-acre Wildlife Management Unit near Wickliffe, Kentucky rye grass grows beneath 17-year-old, 110-foot tall cottonwoods.



Patrick Moore is not the only Greenpeace member to jump ship. Dr. Bjorn Lomborg, a political scientist and professor of statistics at Denmark's University of Aarhus, challenges dire predictions by the World Wildlife Fund, Worldwatch

Institute and Greenpeace concerning global warming, forest depletion, species' extinction and population-driven resource depletion in his new book, *"The Skeptical Environmentalist"* [Cambridge University Press] Dr. Lomborg began researching his book in 1998 in the hope of rebutting "as right-wing propaganda" the work of the late Dr. Julian Simon, a University of Maryland economist who made a career of debunking the predictions of Dr. Paul Ehrlich, president of Stanford University's Center for Conservation Biology.

"Three months into the project we were convinced that we were being debunked instead," Dr. Lomborg said of Dr. Simon's work in a recent New York Times interview. "Not everything he said was right. He has a definite right-wing slant. But most of the important things were actually correct."

Among the mythologies Dr. Lomborg corrects in his book: the Worldwatch Institute 1998 claim that, "The world's forest estate had declined significantly in both area and quality in recent years." But according to the longest running set of records, those kept by the United Nations Food and Agricultural Organization, global forest cover increased since 1950 from 30.4 to 30.89 percent. Moreover, Canada is gaining about 175,000 hectares of forest annually, not losing 200,000 hectares as Worldwatch reported.

According to Dr. Lomborg, world forest loss—only 20 percent since the dawn of agriculture—is far less serious than the 67 percent loss claimed by the World Wildlife Fund. The present loss rate—about 0.46 percent due mainly to urban and agricultural expansion—is much less than the two percent loss many environmentalists cite.

Though no longer a member of Greenpeace, Dr. Lomborg insists he is still an environmentalist. "I'm a left-wing guy," he told *Times* writer Nicholas Wade, "and a vegetarian because I don't want to kill animals. So you can't play the 'he's right-wing so he's wrong' argument." But he parts company with former colleagues on exaggerated "leftist" claims he says

are distorting society's priorities. "The worse they can portray the environment, the easier it is for them to convince us that we need to spend more money on the environment rather than on hospitals, child day care and other things."



In the weeks after I finished writing this story, I exchanged e-mail notes with several people I had asked to read portions of the manuscript. Of the notes I received, this one from a young lady I met while participating in Boise Cascade's SFI audit near LaGrande, Oregon stopped me dead in my tracks. "Thanks for helping me to better understand forestry," she wrote. "It is so important for you as *Evergreen* and Boise as a company to put a human face on forestry. Consumers have no idea of the tremendous effort that goes into managing forests and making wood products."

The note took me back nearly 16 years to the night of *Evergreen's* unveiling at a Southern Oregon Timber Industries Association meeting in Medford, Oregon. In the course of my presentation to the association's members I promised that I would use the pages of *Evergreen* to "put a face on the timber industry." One sawmill owner in the audience that evening took issue with me declaring loudly, "We know who we are!"

"Yes," I replied, "I know who you are and you know who you are. The problem is that no one outside of this room knows who you are."

People—human faces—have appeared on *Evergreen* covers 46 times since we started publishing. But this issue's cover features our first husband and wife logging team: Rick and Deb Smith from Kalispell, Montana. Despite enormous and costly changes in the logging industry [See "Logging Comes of Age," Page 30] most logging companies are still family-owned. Rick's father,



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(Top) Rudy Ritter, right, and his son, Allen, left, are also strong SFI supporters. The pair logs in South Carolina for Westvaco. "Attention to water quality standards has helped equipment operating and repair costs," the senior Mr. Allen reports. (Bottom) 3,800-acre Island Three, a Westvaco plantation on a Kentucky island in the Mississippi River, is enormously productive. These cottonwoods are 11 years old. The vines are poison ivy.

Clyde, started the business in the 1960s. And now Rick's son, Ben, is testing the waters—logging for another Montana company.

Rick and I spent several hours scouting the location for our cover photograph, which gave me a chance to ask if Ben was going to become the third generation of Smith loggers. "It would please me if he did," Rick says, "but the decision is his, so I guess you could say we're running the business as though he won't, but

we're hoping he will."

The elder Smith must have asked himself the same question when Rick went off to West Point in 1971. But he would not have to wait long for the answer. After one semester Rick came home and enrolled at Montana State University where in 1976 he received his degree in Industrial and Management Engineering. He bought the company from his father in 1985. Rick runs the woods operation and Deb runs the office, keeps the books, pays the bills and chases parts when they are needed at distant logging sites. "I would be hard-pressed to get through the day without her," Rick says of his wife.

Smith Logging's big customer is Plum Creek Timber Company, Montana's largest industrial timberland owner and, at 7.8 million acres, the second largest forest landowner in the U.S. "Mainly, we do commercial thinning work for them," Rick explains. "We remove only the poorest quality trees or those that are diseased, leaving the best trees behind as a natural seed source for the next forest. Secondly, we work to improve diversity by leaving behind a mix of tree species of differing ages. It's good insurance against the onset of diseases which tend to focus on a single tree species."

There are also three Smith daughters. Jessie, Heather and Megan are college students seemingly headed in other career directions. But if I were a betting man I'd put money on Jessi, the oldest daughter and a geo-physics major at the University of Montana, becoming a logger. The Sunday we

took pictures she drove the mechanical harvester back to its parking spot in the woods. As the giant machine rumbled past me I could not help but notice the mile-wide grin on her face.

You cannot look into Smith family eyes and see greed or any of the other character flaws big city newspaper cartoonists stereotype in sketches designed to turn public opinion against those who harvest the nation's wood. What you do see are a husband and wife most folks would





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**(Top)** Tom Wynne stands atop a log deck on his Tree Farm west of Olympia, Washington. Small private timberland owners like Mr. Wynne own 59 percent of the nation's forests and provide about 49 percent of the annual harvest. Most small landowners harvest timber to create or maintain wildlife habitat. **(Bottom)** This beautiful sunlit stand of Douglas fir is one of many on Mr. Wynne's property.



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**(Top)** Though they are both the same diameter [six inches] these cross sections illustrate the value of thinning. On the left, a section from a 60-year-old unmanaged forest. On the right, a section from a 20-year-old managed forest. **(Bottom)** A Smith Logging Company mechanical harvester begins its uphill journey after thinning two lodgepole pine trees from a Plum Creek plantation west of Kalispell, Montana.

love to have as next-door neighbors. They embody an essence that is central to all human endeavor including logging and forestry: honesty, a strong work ethic, a giving heart, and love of family and Country — values that were ridiculed in the years after Vietnam but suddenly became important again in the terror and heartbreak of the World Trade Center tragedy.

Not every logger or landowner is as environmentally aware as those we have featured in this very long essay. Yet despite human failing, America's

nearly ten million forest landowners, working in concert with the nation's one million loggers and mill workers, have managed to create a natural bounty unrivaled in world history. That our nation's forest future has been secured is indeed a tribute to the resiliency of nature, but it also a tribute to the dogged determination of extraordinarily gifted men and women who, for nearly a century, have put their money and their reputations on the line in service to a vision that is today as sparkling as it was when

George S. Long first pictured it in 1909. As the West's big forest firefighting cooperatives took shape he confided to a colleague that it was time for Weyerhaeuser to begin searching for ways to ensure that there would be "another new crop of timber ready to cut before the old one is gone."

Ninety-two years later, the search continues. Four generations of Americans have been housed and the forest that will house the next is in the ground and growing.



# LOGGING COMES OF AGE

**W**hen Bill Hagenstein signed on with the old Polson Logging Company at Grays Harbor, Washington in 1931 he carried a four and one-half pound axe, an eight-pound maul, a 13-pound 11-foot two-man crosscut saw, a six-pound spring-board, a five-pound water bag, forty pounds of steel wedges and his lunch: 78 pounds in all.

"We were human pack animals," he recalled in a recent *Evergreen* interview. [See "The Bountiful Harvest: Securing America's Forest Future," Chapter 1] "But I was a big kid at 16: 6-foot 5 and 185 pounds. That's when I started falling timber."

My, how times have changed. Today's timber faller is more apt to go to work carrying a cellular phone and a laptop computer. He sits comfortably in an air-ride seat the size of a living room lounge chair in an air-conditioned cab atop a \$600,000 mechanical harvester. Using joy sticks and buttons mounted on each arm of his seat he effortlessly manipulates the machine through stands of trees. An on-board computer helps him select which trees to cut and which to leave behind, and where and where not to harvest. At the end of the day he pushes a button and a satellite

uplink sends his daily production report to an office computer at the speed of light.

"The era of the logger as Paul Bunyan is long gone," observes John Manz, recently retired Weyerhaeuser Director of Applied Technology for Forest and Woods Operations, a Registered Professional Forester, Accredited Logging Professional and, for 30 years, one of the most influential global voices in logging technology.

"To the extent that his at-the-tree decisions are driven by scientific, economic, social and customer considerations, today's logger might more appropriately be described as a working silviculturist," explains Mr. Manz. "And to the extent that today's advanced logging technologies allow for very concise and efficient tree removal, yesteryear's axe has been replaced by a "surgeon's scalpel." The result is that regulators and consumers now have unprecedented assurances that their objectives and concerns are being addressed in meaningful and measurable ways."

Indeed, it would seem that technology has the sun rising again on a U.S. industry that only a decade ago was thought to be entering its sunset years.

A log truck winds its way through a pre-dawn forest on Washington's Olympic Peninsula



Software-based programs that simulate forest growth and harvesting responses, hand held and machine mounted global positioning systems and satellite imagery are among the technology-based tools that are helping landowners and their loggers make better decisions on the ground.

[See "Forestry At The Millennium" by Valerie Jaffe, [www.evergreenmagazine.com](http://www.evergreenmagazine.com)] So too is forest certification— independent, third party verification of the sustainability of forest management practices. Its aim is to assure lumber retailers, building contractors and consumers that harvesting and management operations are not harming the environment. [See Chapters 7–8, "The Bountiful Harvest: Securing America's Forest Future"]

Inside the logging industry itself brute force is yielding to graceful machines that work with the surgeon-like dexterity Mr. Manz describes. Yes, some loggers are still packing chainsaws, particularly in the West's more mountainous regions or where trees marked for harvest are too large to be felled by machine. But where terrain and tree diameter are not limiting factors the heavy lifting—including the actual cutting—is done by machines, making logging safer, more productive and more environmentally sensitive than earlier technologies that emphasized power only.

You might think mechanized harvesting machines that weigh 30 tons or more—and are capable of lifting half their weight—would make a terrible mess in the woods, but they don't. Because their weight is distributed over wide tracks, or supported by oversized flotation tires, the ground pressure they exert [measured in square inches] is half that of a walking man—and many times less than that of a horse. Were you to follow one of these giants through the forest you would likely be surprised by the lack of soil disturbance. But the incongruity does not end here. With circular saw blades that spin at thousands of revolutions per minute they are capable of severing a 30-inch diameter tree at ground level in seconds. In a single



(Top) A cut-to-length forwarder moves slowly through a thinning project on western Washington's Olympic National Forest. The machine belongs to the contractor, Hermann Brothers Logging Company, Port Angeles. CTL technology has done much to transform logging from a brute force business to one requiring both skill and finesse. But some jobs (Bottom) still require strong backs and determination. Here a mud-covered Hermann Brothers' "landing chaser" removes a "choker" cable from a log brought uphill by a conventional cable logging system.

fluid motion, the machine's powerful hydraulic arms lift the tree skyward then gently lay it on the ground, assuring that its valuable wood it is not damaged.

"In logging—as in forests and forestry—the only constant is change," says Mr. Manz, who recently joined the Evergreen Foundation Board of Directors. "Over the last century, we have moved from brute strength to waterpower, from animal power to steam and, finally, the internal combustion engine. The future cannot and will not be held back. We either embrace change or we perish."

But of all the often conflicting changes that have swept over the nation's forest products industry in recent years—the rise of global environmental concern, fierce global competition, increasing consumer demand for wood-based products, competing recreational demands, forest regulation on private land and monumental demographic shifts—Mr. Manz says only two lie within the direct purview of loggers and landowners.

"We can decide to manage forests,

both public and private, in a manner that is economic, addresses landowner requirements and is ecologically sensitive. Thereafter, we can strengthen the professional requirements for employment in forest-based industries. Loggers and those who design and build their equipment have answered the call in the only way they can—by designing and building machines that are both more productive and more environmentally sensitive and by imposing training and continuing education requirements on themselves."

Over the last 50 years, logger-day productivity has increased by a factor of seven. Brains and information-based technologies have so completely replaced brawn that in some countries the public's perception of loggers has undergone a remarkable transformation. Scandinavians, for example, now admire loggers for their professionalism in much the same way that they admire medical doctors.

The double-bitted axes and "misery whips" [two-man crosscut saws] of Mr. Hagenstein's day have given way to three well choreographed logging methods: "full tree," which yields 50 percent of global harvest; "whole tree," 20 percent; and "cut-to-length," 30 percent. In full tree logging operations the trees are felled and skidded to roadside for delimbing and/or processing and loading. Tree length systems de-limb trees before they are skidded to roadside. Cut-to-length [meaning "cut-to-your-log length"] logging systems employ two machines: a harvester which fells, delimbs, crosscuts, scales and sorts the logs into piles and a second machine that carries or "forwards" them to roadside.

Many logging engineers believe that the future lies in further advancements in cut-to-length [CTL] logging systems. And if a 1993 U.S. Forest Service report is any indication, it's easy to see why. The report, summarizing the results of CTL tests in Idaho and Montana national forests, cites reduced soil compaction, minimal erosion, increased tree utilization, reduced road

building costs, less incursion on wildlife habitat and an aesthetically more pleasing outcome as reasons why CTL logging holds great promise as a tool for efficiently thinning overly dense forests.

“CTL logging is a terrific tool, especially in forest thinning,” says Tim White, Timberjack’s Manager of Sales Development and another recent addition to the Evergreen Foundation Board of Directors. “Think about this for a moment. When we properly thin a forest we stimulate growth in trees that are left behind. It’s like planting a 30 to 40 year old forest. We can also reduce the risk of wildfire, create or protect wildlife habitat or improve the aesthetic quality of the forest.”

Mr. White concedes that CTL systems are very expensive but he quickly adds, “Their operational efficiency compensates when they are used in the kinds of forests for which they were designed.” Such forests are found wherever economic and climatic conditions favor fast growing plantations: from Sweden and Finland to Indonesia, South Africa, New Zealand, Australia and Brazil. And in the United States, from Maine to the Pacific Northwest’s Douglas fir forests to the Southeast’s southern pine forests. Indeed, the success of the more than 80 sustainable forestry initiatives now in play around the world appears to hinge — at least in part — on increased acceptance and use of cut-to-length technology or other advanced “light-on-the-land” logging systems.

Still, Mr. Manz cautions against unqualified endorsement of any particular system. “All harvested trees are eventually segmented into their various products — small logs, larger logs, chips and pulpwood,” he explains. “The question is where can this be done most efficiently—in the woods, at roadside or at the mill. Answers vary as a function of fuel costs, transportation routes and proximity to mills. Once you filter all the data you can determine which system is best. Sometimes the answer is a chainsaw and a 30-year-old log skidder.”

Though Timberjack holds a commanding presence in the world of advanced logging systems, it is by no means the only company pioneering new technologies designed to reduce the impact and increase the productivity and safety of giant woods machines. Caterpillar, perhaps best known for its brutish yellow bulldozers and earthmovers, has developed a rubberized track system that bridges the gap between



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(Top) Keith Olson is the executive director of the Montana Logging Association (MLA), creators of ALP—the Accredited Logging Professional training program—one of the most widely admired programs of its kind in the United States. (Bottom) Pat Woolard runs a mechanical harvester for MLA member, Smith Logging Co. Mr. Woolard’s experience and skill level are such that, at his discretion, he can harvest or not harvest trees in thinnings Smith Logging does for Plum Creek Timber Company. He makes his decisions based on a landowner silvicultural prescription that favors leaving multiple tree species and the best quality trees within each species.

bulldozer-like steel tracks and flotation tires. The tracks, which look a bit like conveyor belts with cleats on them, allow the company’s Mobile Track Forwarder to carry heavy loads of logs across sensitive terrain where rutting and subsequent erosion would otherwise be a problem. Specifically designed for use in southern forests, which can be wet for months on end, the tracks leave almost no footprint in their path. Because its four rear axles can

tilt from side to side the machine is surprisingly agile, allowing the operator to maneuver the machine between closely spaced trees without damaging them.

Other companies—Timberline and Tigercat among them—are adapting their machines to gain operating efficiencies, agility and adaptability—all essential in a logging industry where, despite soaring fuel, labor and equipment costs, loggers aren’t getting paid much more for their work than they were 20 years ago. Fortunately the cost squeeze loggers are facing has not gone completely unnoticed. Several landowners—Boise Cascade, Mead, Westvaco and Seven Islands Land Company among them—are doing everything possible to keep their machine-laden loggers working year-round.

“Banks want to know that your work situation is secure before they lend large sums of money,” a North Carolina logger told me. “If you can’t show that you’re working steady you probably won’t get the equipment loan you need.”

But for all the technological advancements that have been made in recent years, the greatest changes in logging are not in machines, but in those who own and operate them. The hell-roaring days are indeed gone. So too is the era when a young man with a strong back and a desire to work hard could buy a chainsaw on the installment plan and “go logging.” It costs a million dollars minimum—in capital alone—to get into the business today. Banks that routinely loaned money for chainsaws think long and hard before loaning millions to someone with no business track record. Those entering the profession today—the newcomers as well as the sons, daughters and grandchildren of earlier generations of loggers—often hold masters’ degrees in business administration or engineering. Many also hold advanced degrees in the natural sciences: biology, botany or forestry.

“It is not an exaggeration to say that a culture is being replaced by a profession,” says Keith Olson, executive director of the Montana Logging Association.

According to Mr. Olson, the driving force behind the self-styled uprooting of logging’s well-worn culture has been a desire by loggers to be seen as professionals capable of responding not just to landowner need but also to widespread public concern for the visual appearance and seeming destruc-



tiveness of logging. "We have always been defined in terms of our worst performers," Mr. Olson says of the training program MLA developed in the early 1990's in the hope of altering the industry's poor image.

"We want people to see us in terms of our best performers and, at the same time, we need to continuously elevate our performance standards."

Mr. Olson and his directors sought the assistance of Montana's Extension Forestry Department, which, by 1991, had developed a Forest Stewardship Workshop designed to help small landowners better understand their forest management options. Two MLA member loggers — landowners themselves — enrolled in the course in 1993 and were so impressed by it that they suggested that Mr. Olson begin a dialogue with extension forestry foresters. The result was a series of three five-day, 40-hour stewardship workshops conducted in early 1994 and designed to help loggers help landowners meet their forest stewardship objectives.

"Different landowners might well place different values on the same tract of land," Mr. Olson explains. "It is the 'loggers' job to help landowners develop management plans that protect what they value most, be it timber, a home site, wildlife habitat or a healthy forest. But no matter the value chosen, the Stewardship Workshops treat timber as a byproduct of the whole forest, not the only product. As you might imagine embracing such a viewpoint is a real leap of faith for loggers who have historically viewed production as the primary key to success. But once that leap is made, everything seems to change for the better, particularly our relationships with small forest landowners who are naturally leery of production loggers."

The stewardship workshops program proved so popular with participating loggers that MLA's directors decided to make them the foundation for their long contemplated Accredited Logging Professional [ALP] program. The program, unveiled in the spring of 1995, requires loggers to complete the Stewardship workshop and an eight-hour CPR and first-aid workshop. They must also demonstrate a clear understanding of Montana's Best Management Practices and the state's Streamside Management law. Since 1995, more than 250 MLA members have completed the program.

Stewardship workshops are conducted at the University of Montana's Yellow Bay Biological Station on Flathead Lake. Among the course offerings: Forest Stewardship Objectives, Important Plants That Every Forest Steward Should Know, Tree Growth and Measurement, The Wildlife Resource, Forest Structures,



(Top) Mechanical harvesters like this one are capable of harvesting trees as large as 40 inches in diameter on surprisingly steep slopes. Still, there are places (Bottom) where the harvesting is still done the old fashioned way: with chainsaws in the hands of skilled timber fallers. The work is tough and dangerous.



# CUT-TO-LENGTH LOGGING SYSTEMS

Cut-To-Length harvesting technology is a superb tool for thinning in plantations and other forests in which the presence of too many trees thwarts forest growth and health. In plantations, thinning stimulates growth in residual trees. Elsewhere, it is used to increase structural and biological diversity, or to reduce the risk of wildfire and the onset of insect and disease infestations.

CTL logging rests on the choreographed use of two machines: a harvester **(one and seven on facing page)** and a forwarder **(six)**. The harvester does just what its name implies: it harvests trees. The forwarder forwards—or carries—processed logs to a pre-determined point where they are loaded on log trucks for transport to a their destination—a sawmill or pulp mill, or both.

The business end of the harvester—sometimes called a “processor”—is its “head” **(five)**. Processing heads are capable of performing several tasks in a single uninterrupted motion. They can de-limb a harvest tree, cut it into pre-determined lengths **(two)**, color-code logs blue or red **(three)** destined for use as lumber or pulp, or spray fungicide **(four)** on stumps to prevent the spread of disease.

CTL systems put loggers in steel reinforced cabs, so they are much safer than hand-held chainsaws, which offer no protection from falling trees or limbs. And because they move about on wide-track tires or steel tracks their weight is well distributed, leaving a “foot-print” much lighter than that of a walking man. They are also far more efficient because so much of the work is done quickly by computer-controlled functions.



Jim Petersen



Jim Petersen



Jim Petersen



Jim Petersen



Jim Petersen



Jim Petersen



# Safe, Efficient, “Light-ON-THE-LAND” Technology

Caterpillar six-wheel-drive timber harvester, equipped with a processing head mounted on a pendulum arm designed to keep the operator level in his cab. Pendulum arm suspension also helps distribute the weight of the machine and the log, minimizing soil compaction. A gearless, hydrostatic transmission keeps the tires from spinning, further protecting soil.







Jim Petersen



Jim Petersen



Caterpillar

Horses and oxen were widely used on logging operations a century ago, before steam and the internal combustion engine took over. But horses exert more ground pressure per square inch than do modern flotation tires **(Center)** or **(Bottom)** rubberized systems like Caterpillar's Mobile Track, which reduces soil compaction by 75 percent.

Sensitive Plant Species in Montana, Riparian Wetland Stewardship, Forest Insect and Disease Identification, Principles of Selection Harvesting, and Geology, Soils and Road Construction.

Though ALP is unique in terms of its logger-landowner link, it is but one of a dozen or more logger certification programs that have emerged across the country in recent years. All of the programs share common elements: on the job safety, fire and first-aid training and adherence to state and federal regulations designed to help minimize soil erosion and damage to watersheds and fish-bearing streams.

Across the country loggers are nearly unanimous in their support of big changes that are clearly costing them an enormous amount of money, particularly in terms of the enormous capital outlays required to buy equipment that can operate efficiently and profitably in today's regulatory climate.

"The benefits totally outweigh the costs," says South Carolina logger Jimmy Smith. "I would not go back to the old days. We're doing a better job on the land, I'm not running my equipment as hard as I once did, there is less waste and the job looks better."

Westvaco contract logger Donnie Lambert agrees. "Today's light-on-the-land logging systems definitely cost more but they do more, so it's probably a wash. Besides, the company keeps me busy year-round, which means I can keep a well-trained crew on the job. And we're not tearing up the forest like we used to. Everybody wins."

Mr. Manz concurs.

"As professional managers in various segments of the forest industry, we are, in the final analysis, the masters of our own fate. Our major challenge is not the production of new products from a 'better' forest. It is the clear articulation of issues, opportunities and solutions to an increasingly sophisticated, educated and polarized populace. To be a professional today it is no longer sufficient to understand only forests and machinery, numbers and charts, labor and supervision. We must fully understand and be a part of the real world that surrounds us. We must be effective communicators, negotiators, managers, leaders and students. We must learn to engage all of our constituencies from the customer to the regulator to the average citizen. As the world's population expands and management of the biosphere becomes critically important, it is up to each of us as professionals to lead the way. We must be proactive, because once the issues have become emotional mere reaction to them will not suffice — and we cannot afford to expend our political goodwill or financial strength in the winning of pyrrhic victories."



# LOG A LOAD FOR KIDS

## Sustaining "Our Most Precious Resource"



FRA

**W**hat does a truck-load of logs mean, besides useful products and a sustainably managed resource? To many loggers and timber-based businesses, it means a pledge to a children's hospital.

In 1988, with the encouragement of the Children's Miracle Network (CMN), the South

Carolina Forestry Association organized a campaign to raise funds for a local children's hospital by encouraging loggers to donate the value of a truckload of logs to the hospital. The "Log A Load For Kids™" campaign quickly spread throughout the state, and today "Log A Load" campaigns have taken off in 30 states and in Canada—in each case, culminating in donations to local CMN-affiliated children's hospitals.

CMN, a non-profit organization which mounts a national campaign on behalf of children's hospitals every year, says "Log A Load" is one of its largest sponsors. One-hundred percent of Log A Load For Kids funds donated goes directly to help about 70 local children's hospitals—no overhead or administrative fees are deducted. Accumulated donations since the program started now exceed \$15 million, and 2001's national fundraising goal is \$3 million.

Early on in the program, it became clear that simply donating funds was not the whole extent of loggers' involvement. Loggers and foresters often work with hospital staffs to identify critical funding needs and organize efforts to fill

Alabama logger Jimmy Hudspeth and oncologist Dr. Robert Castleberry back up Children's Miracle Network hospital patient Eli Weaver in his successful fight against lymphocytic leukemia. Log A Load fundraising now supports kids with special needs in 30 forested states.

specific gaps in budgeted programs. In 1995, for instance, Alabama donations supported the development of a special clinic at Children's Hospital in Birmingham for prevention and treatment of child abuse, and Arkansas Log A Load began designating donations in 1999 to create an endowed "Log A Load for Kids Chair of Cardiovascular Surgery" at

the Arkansas Children's Hospital. Loggers, and other forest products people, have shown great dedication and creativity in organizing events such as log auctions, golf tournaments, raffles, "charity harvests"—even dunk tanks at community carnivals—to benefit kids with special needs and to affirm their own commitment to their communities' future.

Betsy Luoto, co-owner of Oregon's Cross & Crown logging firm, currently chairs the Log A Load For Kids Advisory Council, which sets national fundraising goals and helps state campaigns co-ordinate and share information with each other. "I am proud to be a part of the wonderful group of people from all over our nation who work hard to produce, manage, and harvest the timber needed and used daily by each American in all facets of life," she says. "These people go selflessly beyond themselves when their workday is done to raise funds to help children in need of a second chance at life. We are not afraid to try."

For more information about this remarkable program, and how to participate in it, please visit [www.logaload.org](http://www.logaload.org).

# Montana Ford Dealers Contribute Truck To The Evergreen Foundation

**T**he Montana Ford Dealers' Advertising Association has donated a 2001 Ford pickup to the non-profit Evergreen Foundation, publishers of *Evergreen Magazine*.

Bart Depratu, President, Depratu Ford, Whitefish, said the association made the decision to provide a pre-paid three-year lease to the Foundation because "we admire their work and their even-handed approach to often contentious forestry issues."

Jim Petersen, the Foundation's executive director and editor of *Evergreen Magazine* said the arrangement is the first such the organization has received in its 15-year history. "Suffice it to say, we're thrilled that Montana's Ford dealers would want to help us in this way."

Recent Ford Motor Company contributions to environmental organizations, totaling more than \$15 million, have angered loggers, farmers, ranchers and grass roots organizations across the nation, though both Mr. Depratu and Mr. Petersen downplayed the role these contributions played in the Montana dealers' donation.

"There's no question about the fact that many Montana Ford dealers have gotten an earful from angry customers," Mr. Petersen said. "I think Montana's Ford dealers simply wanted to align itself with an organization that is respected in the scientific community and at the grass roots level. That's Evergreen."

Mr. Depratu concurred. "We see Evergreen as an organization capable of helping us strengthen our partnerships in rural timber communities. In the months



Jim Petersen

The Evergreen Foundation's new 2001 Ford pickup, a gift from the Montana Ford Dealer's Advertising Association.

to come we hope to develop some tools that will enable us to become more proactively involved in forestry-related issues that impact our businesses and our communities."

Participating Members of the Montana Ford Dealers Association include Archie Cochrane Motors, Inc., Billings; Bell McCall, Hamilton; Big Sky Motors, Inc., Dillon; Bison Motor Co., Great Falls; Bitterroot Motors, Inc., Missoula; Bozeman Ford-Lincoln-Mercury, Bozeman;

Brooks Hanna Ford, Butte; Capital Motors, Helena; Country Ford-Mercury, Plains; Courtesy Ford Sales, Conrad; Davey Motor Company, Columbus; Delta Ford, Inc., Malta; Depratu Ford-VW-Audi, Whitefish; Don Aadsen Ford-Mercury, Ronan; Doughten Ford Sales, Chinook; Hardin Auto Co., Hardin; Havre Ford-Lincoln-Mercury, Havre; Heberle Ford-Mercury, Forsyth; Hi-Line Ford, Inc., Glasgow; Hilltop Motors, Lewistown; Larson Motor Co., Inc., Sidney; Laurel Ford, Laurel; Livingston Ford-Lincoln-Mercury, Livingston; Mac's Frontierland, Inc., Miles City; McKinney Motors, Culbertson; Mills Motor Co., Inc., Fairfield; Northern Ford, Cut Bank; Plentywood Motor Sales, Inc., Plentywood; Power Motors, Fort Benton; Rathert-Fox Ford-Mercury, Inc., Wolf Point; Ray Judd Ford, Inc., Red Lodge; Rice Ford Sales, Whitehall; Rygg Ford Sales, Kalispell; Shelby Motors LLC, Shelby; Stetson Ford, Inc., Big Timber; Timberline Auto Center, Libby; Urbanec Motors, Inc., Glendive and Valley Sales, Townsend.

## International Joins In

Just weeks after the Montana Ford Dealer's Advertising Association contributed a new 2001 Ford F250 to the Evergreen Foundation, International Truck and Engine Corporation, makers of the Power Stroke Diesel used in Ford trucks, reimbursed the Foundation for the added cost of the motor.

Foundation executive director Jim Petersen said International's gift will be used to help fund a special report describing the role diesel power played in the opening and subsequent management of the West's forests.

"Diesel power played a historic and very positive role," Mr. Petersen explained. "But like so many other good news forestry stories it has received too little attention."

International communications manager, Robert Carso, said the company is pleased to have the opportunity to affiliate itself with the Foundation's efforts to promote science-based forestry.



**To order reprints of this issue log on to our web site: [www.evergreenmagazine.com](http://www.evergreenmagazine.com)**

**T**he Evergreen Foundation is a non-profit forestry research and educational organization dedicated to the advancement of science-based forestry and forest policy.

To this end, we publish *Evergreen*, a quarterly journal designed to keep Foundation members and others abreast of issues and events impacting forestry, forest communities and the forest products industry.

We also operate a web site — [www.evergreenmagazine.com](http://www.evergreenmagazine.com) — designed to inform members and others of issues and events that develop too quickly to permit timely coverage in *Evergreen*. The site also provides global hot links to sites maintained by scientists, forest landowners, forestry associations, universities, grass roots and other non-profit organizations that share our commitment to science-based forestry.

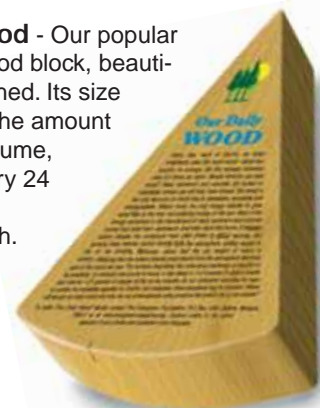
*Evergreen* was founded in 1986. Initial funding came from a small group of Southern Oregon lumber companies interested in promoting wider citizen involvement in the federal government's congressionally mandated forest planning process. In the years since its founding, the magazine has assumed a much wider role, providing forums for scientists, policy makers, landowners and community leaders across North America.

Support for our educational work comes from members and other public and private sector non-profit organizations that share our commitment to science-based forestry. We operate under Internal Revenue Service 501(c)(3) regulations that govern the conduct of tax-exempt organizations created for charitable, educational, religious or scientific purposes. Our Federal Tax Identification Number is 94-3112976. Contributions are tax deductible to the full extent allowed in the case of 501(c)(3) corporations.

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## The Evergreen Store [www.evergreenmagazine.com](http://www.evergreenmagazine.com)

**Our Daily Wood** - Our popular pie-shaped wood block, beautifully hand-finished. Its size approximates the amount of wood, by volume, consumed every 24 hours by every person on Earth. Silk-screened message explains the environmental advantages of wood. \$35.00



**Minute Wood Blocks** - These hand-finished wood wedges represent the amount of wood consumed every 15, 30 and 60 minutes by each of Earth's six billion inhabitants. The wedges are cut from sanded aspen and sold in sets of three. Custom orders featuring company logos, are available. Bulk order quotation on request. Price includes shipping. \$15.00



## Heirloom Adirondack Chair -

Handcrafted from solid cedar. Built to last a lifetime. Seat and back are curved for optimal comfort. Stained and oiled for easy use. Easy to assemble—all hardware included. Allow four weeks for delivery. Price includes shipping. \$355.00



## Metric Equivalents

This English To Metric Conversion Table is provided as a courtesy to *Evergreen* readers that use the metric system:

Inch x 25.4 = 1 millimeter	1 acre x 0.405 = 1 hectare
1 foot x 0.305 = 1 meter	MBF x 2.36 * = 1 cubic meter
1 mile x 1.61 = 1 kilometer	1000 sq ft x 0.885 = 1 cubic meter **
Square Foot x 0.093 = 1 sq. meter	Trees/acre x 2.47 = trees/ha
Cu ft x 0.028 = 1 cubic meter	
1 lb x 0.454 = 1 kilogram	**Nominal basis 3/8 plywood
Short ton x 0.907 = 1 ton	



# Evergreen Magazine Contributor List

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**Backround photo:** Columbia Helicopters, Aurora, Oregon, is North America's largest helicopter logger. Here, one of the company's Boeing 234 machines hovers over a recently thinned forest near McCall, Idaho

Columbia Helicopters

# EVERGREEN

M A G A Z I N E

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