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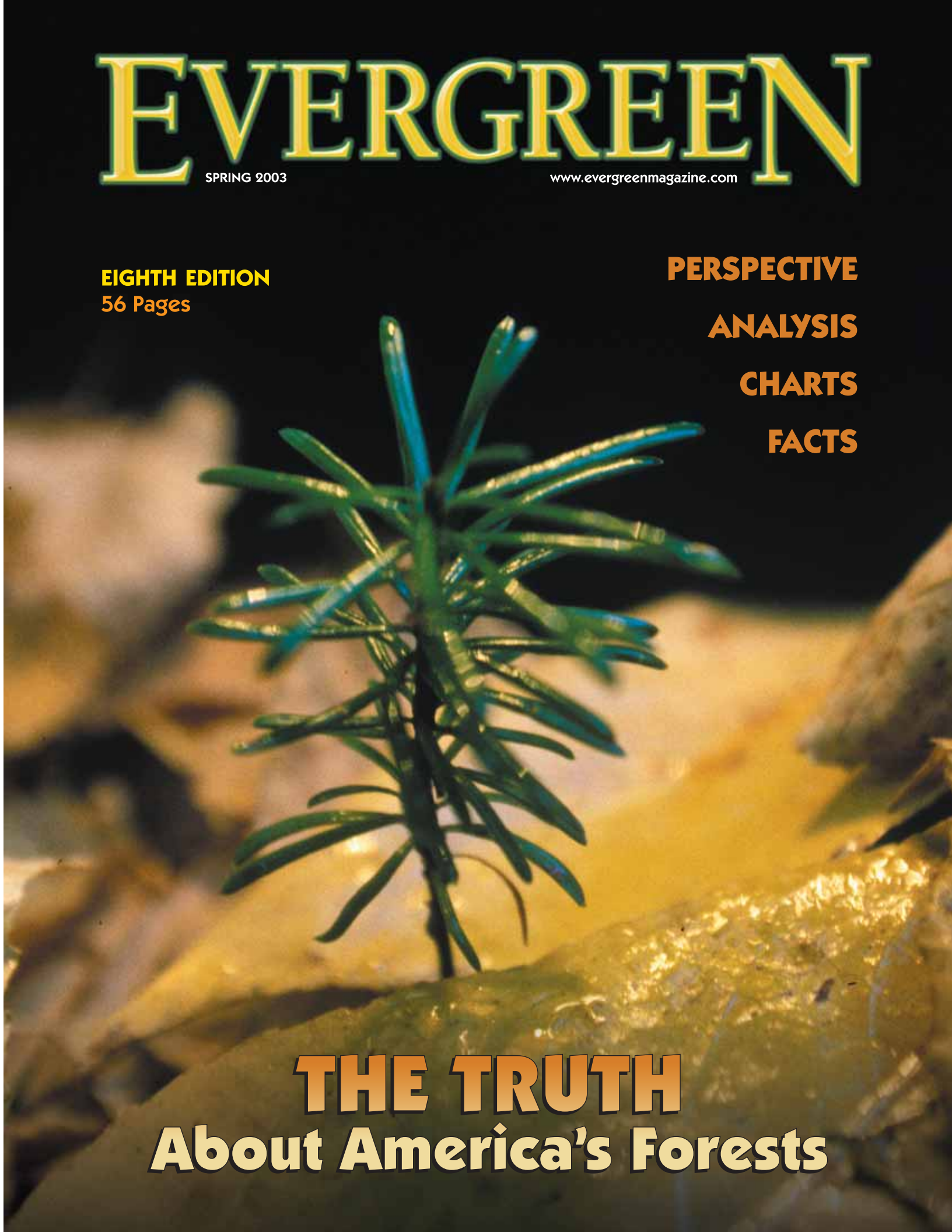
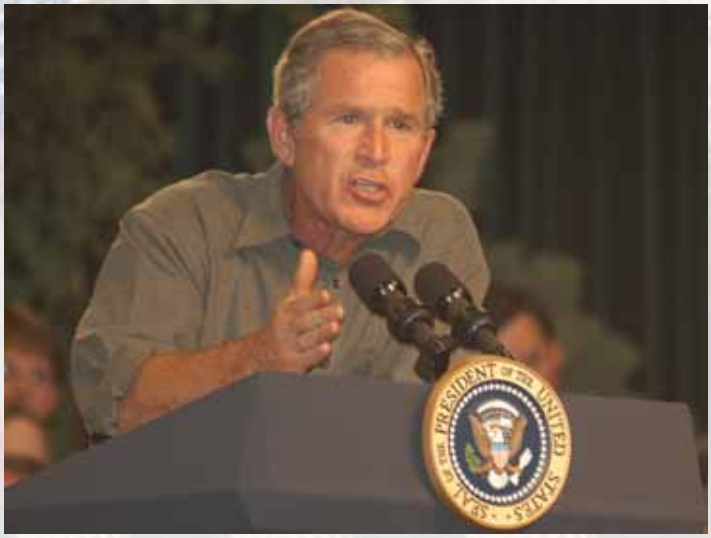


THE TRUTH
About America's Forests

In This Issue



Rob Werfel Photography

President George W. Bush outlining his Healthy Forests Initiative at a press conference in Medford, Oregon last August.

In this issue we tell "The Truth about America's forests."

In the 12 years since the first printing of "The Truth" rolled off the press, more than 700,000 of you have ordered copies. From your thousands of letters we know that you use this reference book frequently. You cite it in Letters to the Editor and in speeches to local civic groups you support. Your school kids use it too, though they are more inclined to seek us out on our website.

We also know you trust this booklet implicitly because it is assembled from publicly funded databases and because the information we present is footnoted as to its source. We continue this tradition in this, our eighth printing.

We are often asked how so much detailed information could be accurately gathered on such a large scale. To do its work the Forest Service maintains 3,112,000 aerial photography points, plus 124,463 inventory plots and 7,861 forest health plots. Although the agency's monitoring program is far more advanced than it was when it was established in 1930 its accuracy still rests on a physical examination of public and privately owned forests that lie within selected plots from coast to coast [one plot per 6,000 acres of forestland]. Among the qualitative and quantitative measures taken on each of 124,463 inventory plots: tree diameter, tree quality, forest regeneration, site quality, forest type, stand age and evidence of natural or human disturbance.

Designated forest health plots undergo an even more rigorous examination. Tree crowns are inspected for signs of stress; soil chemical properties are measured for fertility; vegetation structure and composition are measured to evaluate habitat suitability, fuel loading, plant diversity and carbon cycling; lichen communities are examined for richness and abundance—indicators of climate change, air quality and biological diversity; down woody debris is evaluated to estimate carbon storage, wildfire risk and habitat characteristics; and ozone sensitive plant species are evaluated for the presence of late summer ozone injury.

Of course, the nation's forests hold intrinsic values that are impossible to measure. How do you quantify beauty or solitude? What price does one put on a threatened or endangered species, or biological diversity? To add meaning and context to Forest Service statistics we asked several experts we respect to background you on issues that are currently driving the nation's forest policy discussion. Among the issues: wildfire and forest health, habitat loss, third-party forest certification and the appropriateness of wood use in an environmentally conscious world.

Doug MacCleery sets the stage for you in "A Brief History of U.S. Forests: Does the Past Provide Lessons for the Future?" The ever-thoughtful Mr. MacCleery is the Forest Service's Federal Forest and Rangeland Management Senior Policy Analyst and a frequent *Evergreen* contributor.

Two companion pieces accompany Mr. MacCleery's reprise. "Softwood Resource Conditions and Management Implications" is a meticulously researched paper written by Jay O'Laughlin. Dr. O'Laughlin is director of the Policy Analysis Group at the University of Idaho, and has written widely on the declining condition of western federal forests. His well-documented assessment of the underlying causes of the West's increasingly deadly wildfire crisis is affirmed in "Uncharacteristic Wildfire Risk and Fish Conservation in Oregon," a peer-reviewed paper by Steve Mealey and Jack Ward Thomas. Their paper was presented at an October 2002 wildland fire seminar co-sponsored by the Oregon State University College of Forestry and the Oregon Forest Resources Institute and is reprinted in its entirety with permission of the sponsors.

Several pages of charts—and two extensive bibliographies—accompany the O'Laughlin and Mealey-Thomas papers. They reaffirm what many fire ecologists have been saying for years: our national forests are in serious decline. Minus a major change in forest policy—something only Congress can divine—much of the progress in conservation Mr. MacCleery details will eventually be lost.

President Bush is quite right to be worried about the West's national forests—and right on the mark with his Healthy Forests Initiative, outlined last August during his tour of fire lines in southern Oregon. There is a virtual mountain of scientific evidence supporting the need to modernize environmental laws that no longer serve their original purposes. Until these laws are updated wildfires will continue their deadly work in the West's national forests.

Opinion polls conducted over the last three years confirm that most westerners, including most living in urban centers, understand that forest density and subsequent disease are the underlying causes of these fires—and that removing *some trees* is the only realistic long term solution. But equally clear is the fact that the public will not support programs perceived to be environmentally harmful. Further, there is a general distrust for the motives of

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

Morning sun illuminates the Ross Cedars, a protected grove of 600-800 year-old western red cedars in the Kootenai National Forest about 10 miles south of Troy, Montana

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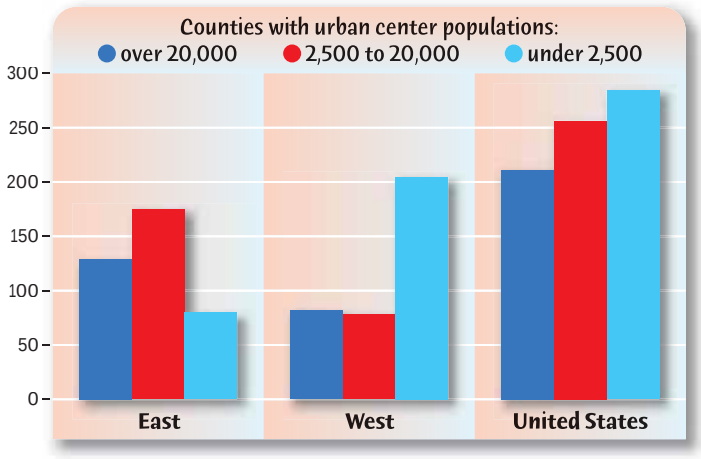
sawmill owners who have sided with the President. But such distrust seems misplaced. We don't know a single company that pines for a return to "the good old days" when nearly 20 percent of the nation's annual harvest came from western national forests. Most companies that survived the collapse of the old federal timber sale program have secured new more stable sources of wood and no longer risk their capital on milling ventures tied to federal forests.

Thus, what was once a harvesting debate is now an environmental debate with social and cultural underpinnings. And suburban folks who've never worked in the woods are now the ones doing most of the out loud worrying. We share their newfound concern, but the fact is the Forest Service will remain powerless to protect publicly revered old growth forests from catastrophic wildfire—to say nothing of rural and urban neighborhoods that lie in harm's way—until failing environmental laws are updated to reflect today's realities. In a perfect world, the agency would pay its own way with revenues derived from a perpetual thinning program, and forests in federal care would be independently certified at ten-year intervals to make certain the public's conservation goals were being met.

Fortunately, the nation's privately owned forests don't suffer from the bureaucratic and political ills that plague the public's forests. Despite soaring demand for lumber and paper products (most of it met by steadily increasing imports from other countries) forest growth on private lands in the U.S. continues to outpace harvest and mortality by wide margins. And unbeknownst to many Americans, these same lands provide most of the forest habitat used by so-called "early succession" plant and animal species—those that thrive in sunlit openings harvesting creates. Such openings are vital to deer, elk, squirrels, wild turkeys, ruffed grouse and many neo-tropical songbirds.

America's private forest landowners are testing some innovative management approaches that bridge the perceived commodity-conservation gap. For perspective read John Olson's insightful story [page 52] concerning Potlatch Corporation's forest certification and conservation reserve programs.

Forest Land by Region & Urban Influence - 1997
in millions of acres



Twenty-eight percent of the nation's forests lie in counties containing urban centers with populations greater than 20,000. While these areas are politically influential, knowledge of forests and their role in American life is minimal. Source: USFS 2000 Resources Planning Act [RPA] Assessment. www.fs.fed.us/pl/rpa/list.htm

Mr. Olson is resource vice president for the company. Conservation reserves are becoming increasingly common in privately owned forests in the U.S., underscoring their smooth fit with adjacent timber producing areas.

We hope you'll also take a moment to read "Think Globally, Act Locally: Use More Wood!" We showcase the Wood Promotion Network, an educational program that touts the scientifically documented environmental advantages of wood use in forums frequented by building contractors and their customers. WPN was formed two years ago after it was discovered that U.S. lumber manufacturers had lost nearly $1 billion in market share to competitors in the steel framing and concrete industries *in just three years*. Worse, television and print advertisements sponsored by the two industries were hyping environmentalist claims that forests were not being sustainably managed. As you will learn in this issue, there is no truth to these claims. A nation as environmentally engaged as ours is should be using more wood, not less.

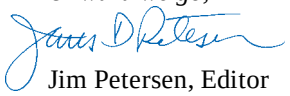
Our WPN feature is accompanied by a series of charts titled, "A Graphic Perspective on the U.S. Forest Products Industry." Despite the worst pulp and paper markets in anyone's memory—and the mergers, consolidations and layoffs fierce global competition has wrought—the nation's lumber and paper industries still employ 1.5 million Americans in high paying jobs.

While pondering the future of high paying jobs in America be sure to read Bruce Vincent's uplifting profile on "Provider Pals," a cultural exchange program he pioneered that pairs junior-high age students with their Providers: farmers, ranchers, loggers, miners, commercial fishermen and oil field workers. As part of the yearlong exchange, rural kids journey to cities, visit factories and take in cultural events while city kids visit farms, ranches, commercial fishing operations, sawmills, mines and logging jobs. The Ford Motor Company thought so much of the program they provided $1.5 million in startup funding. We've seen many fine educational programs over the years, but never one that excites kids so much. We're pleased to have played a small role in its formation.

It's clear we have a very long way to go in our quest to improve the public's understanding of forests and forestry. To find out just how far go to our website www.evergreenmagazine.com [click on "Analysis & Perspective] and read "Fact and Perception," Dr. Jim Bowyer's troubling report. Dr. Bowyer is Director of the Forest Products Management Development Institute in the College of Natural Resources at the University of Minnesota. Since the early 1990s he's been testing students and industry employees to see what they know about forests and forestry. The news is not good. You can take his test on page 40 and check your answers on our website. While there be sure to read "Policy Conflicts Relative to Managing Fire-Adapted Forests on Federal Lands: The Case of the Northern Spotted Owl," by Drs. Larry Irwin and Jack Ward Thomas. It's the companion to the Mealey-Thomas piece that begins on page 41.

We want to extend a heartfelt thank you to our many sponsors, especially the Lematta Foundation, without whose ongoing support the Evergreen Foundation could not survive. Thanks also to Doug MacCleery, Jay O'Laughlin, Jack Ward Thomas, John Olson, Steve Mealey and Bruce Vincent for their writings. The latter two are Evergreen Foundation board members whose contributions to forestry education we value highly.

Onward we go,



Jim Petersen, Editor

A Brief History of U.S. Forests:

Does the Past Provide Lessons for the Future?

By Douglas W. MacCleery

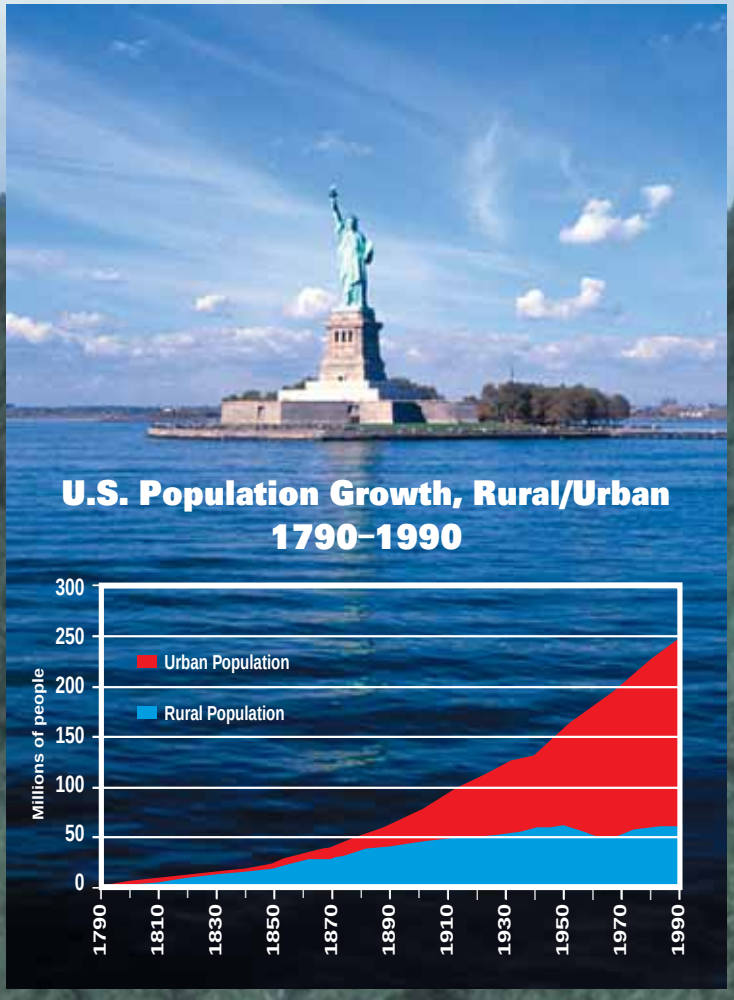
Senior Policy Analyst, Federal Forest and Rangeland Management, National Forest System. USDA/Forest Service.

Over the last two decades, public interest in America's forests, their condition and management, has increased dramatically. Much of this attention has focused on specific issues and controversies, such as clearcutting, the reduction in old growth forests on the Pacific Coast, the salvage of fire-killed timber and similar issues. Most media stories tend to focus on the controversies, rather than on the good news.

Fortunately, there is considerable good news on America's forests and wildlife, especially when one takes a longer term view.

A long-term view is especially appropriate when the issue is forests. The forests surrounding us today reflect decisions and public policies dating back many decades. In order to make wise decisions for the future, we need to seek to understand how existing forests came to be what they are today.

Today's interest is not the first time America's attention has shifted to it's forests. The first national conservation movement was focused largely on the deteriorating forest and wildlife situation in the late 19th century. Many of the public policies



One of the most profound changes in American society has been the transition from a rural, agrarian society to an urban industrialized nation. Although today's society is no less dependent on natural resources than were 18th century subsistence farmers, most Americans living in cities and suburbs are no longer aware of the very direct link between their consumptive lifestyle and the nation's.

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Swan Mountain, a mixed fir forest overlooking Bigfork, Montana gives no hint of having been clearcut by railroad loggers less than a century ago.

that have shaped today's forests have their origins during this period.

This paper will briefly discuss the history of U.S. forests, the policies that were put in place to address forest loss and degradation, and the performance of those policies and other influences as reflected in the current condition and trends of forests and associated wildlife.

Pre-European Forest Conditions

A popular perception today is that, prior to European contact, America was dominated by impenetrable, relatively uniform ancient forests that blanketed the landscape in static, long-term balance with the environment. This image is one of continuous, closed-canopy, structurally complex, "climax" forests which nature maintained for long periods in a steady-state, equilibrium balance with the environment. Closely related to the myth of the forest primeval is the "pristine myth" or the popular perception that American Indians lived in the forests and on the plains but never really did much to change either.

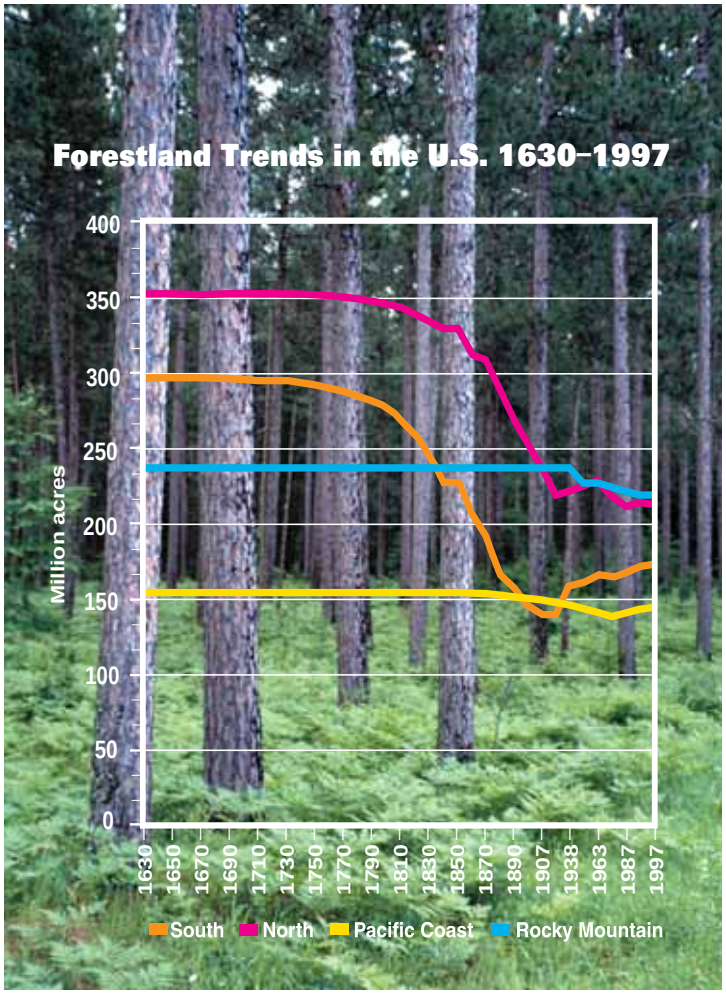
The reality was quite different. Pre-settlement forests were exceedingly dynamic—shaped by a myriad of both natural and human-caused influences, disturbances, and catastrophic events that had a profound effect on the age, plant species, composition, and wildlife of the forest environment (Arno 1985, Butzer 1990, Denevan 1992, Doolittle 1992, Bonnickson 2000).

Even though there is overwhelming physical, biological, as well as anthropological, evidence that these myths are seriously flawed, they still strongly shape conservation policy development in the U.S. today (Cronon 1995).

The Effect of European Settlement on U.S. Forests

Of what there be little doubt is that the arrival of Europeans in North America profoundly changed the nature of human impact on the land.

The America of the early 1800s was overwhelmingly a nation of largely self-sufficient farms. The abundant forests were seen as a primary source of energy and raw materials. Forests were the foundation of early colonial industries, such as shipbuilding and furs (Cronon 1985, Williams 1989). People also cleared the land occupied by forests for growing crops. From 1600 through the early 20th century, U.S. forests were cleared for agriculture at approximately the rate of increase in the nation's human population.



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About 46 percent of the U.S. land base was forested when European settlement began. Despite nearly 400 years of use and abuse about 70 percent (747 million acres) remains forested today. Credit nature's resiliency, conservation, reforestation and advances in forestry. [USFS, *Forest Resources of the United States, 1997,* GTR-NCC-219-2001] Minnesota's red pine forests are a fine example of work done by Depression-era Civilian Conservation Corps tree planters.

The 19th century ushered in a period of rapid population growth. During the century the U.S. population rose over 14 times—increasing from 5.3 to 76 million people, or over 25 percent per decade. During the fifty years between 1850 and 1900, the U.S. population rose in absolute numbers ten times more than it had in the two centuries from 1600 to 1800 (increasing from 23 million to 76 million). The rising population began to put significant pressures on U.S. forests, wildlife and other natural resources.

In the sixty years from 1850 to 1910, American farmers cleared more forest than the total amount that had been cleared in the previous 250 years of settlement—about 190 million acres (Williams 1989). The nation's farmers cleared forest for agriculture at an average rate of 13.5 square miles per day every day for 60 years.

Vast areas of the Midwest, South, and Pacific Coast were logged, and often relogged. The tree limbs, tops, and other debris that remained after logging were often burned in the belief that the logged areas could be converted to cropland or improved pasture. These slash fires burned more or less continuously, and when weather conditions were right, sometimes resulted in massive wildfires, property damage, and major loss of human life.

The nation's wildlife faced many of the same pressures as its forests. A wide variety of wildlife species, which at the time of settlement had been present in huge numbers, were being severely depleted. The most significant factors were virtually unrestricted market hunting of all kinds of wildlife for food, furs, and, feathers (which in the late 1800s were in great demand for women's hats), as well as habitat modification caused by farm clearing, logging, and massive wildfires (Trefethen 1975).

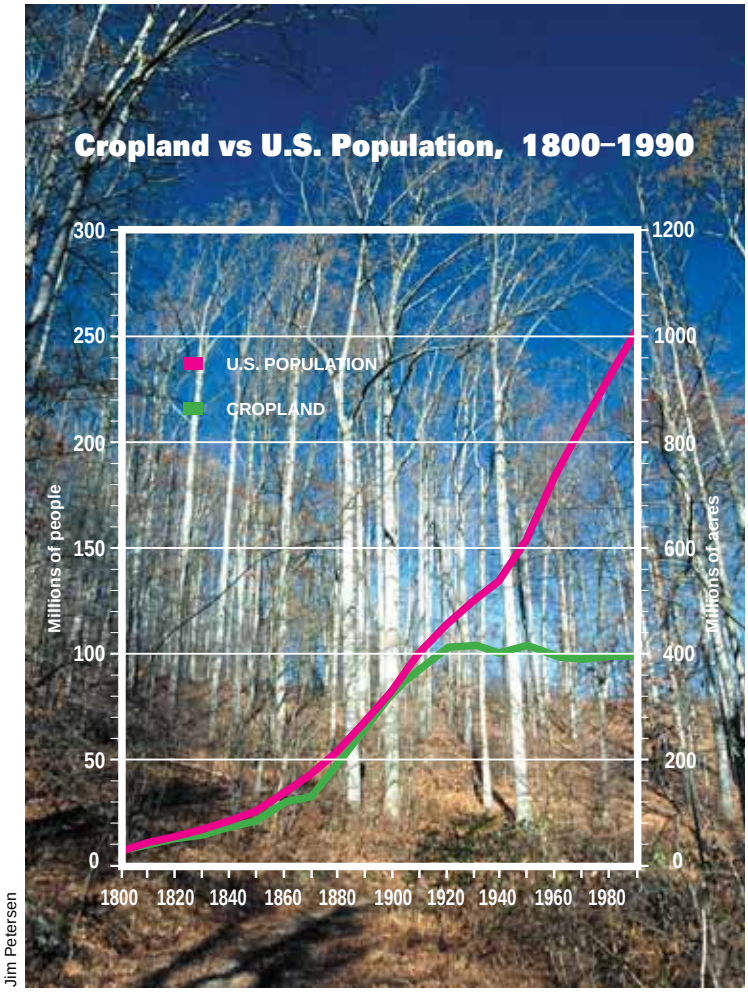
Rise of a National Conservation Movement

The rapidly declining forest, wildlife, and other environmental conditions of the late 19th century provided the impetus for the first national conservation movement. The concern that things had gotten "out of balance" was a common theme of early conservationists, such as George Perkins Marsh, and reflected their con-viction as to the need to adjust the direction events were taking.

One of the first priorities of this fledgling movement was a war against market hunting for meat, hides, and feathers. This effort included a campaign to put in place strong state and federal wildlife conservation laws and the professional agencies needed to enforce them. Concurrent with these efforts were actions to reserve public lands for protection and manage-ment, e.g., national forests, national parks, national wildlife refuges, etc. (Trefethen 1975). The conservation policy framework that was put into place included the following:

- To close the Public Domain to further private land disposal and to reserve remaining public lands for protection and manage-ment, e.g., national forests, national parks, national wildlife refuges, etc.
- To promote and encourage the protection of forests and grasslands, regardless of their owner-ship, from wildfire, insects and disease.
- To improve the art and science of natural resource management by acquiring scientific knowledge on the management of forests and wildlife and on the more efficient utilization of raw materials.
- To improve the management and productivity of agricultural lands and forests (70 percent of the latter which were privately owned) through research and technical and financial assistance.
- To adopt and enforce federal and state wildlife conservation laws.

In addition to the conservation policies described above, a number of fortuitous events combined in the early 1900s to substantially reduce human pressures on forests and wildlife. One was the spectacular increase in agricultural productivity, which after the 1930s, rose at a rate greater than population growth. Others were the conversion from wood to fossil fuels and the shift from draft animals to internal combustion engines. These trends greatly reduced the human pressures on forests and other wildlife habitats and populations for food and energy. As the area of cropland stabilized, so did the area of forests. Today the U.S. has somewhat less cropland and about the same area of forest it had in 1920.



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Between 1850 and 1910, farmers cleared about 13.5 square miles of forestland *daily* to feed America's burgeoning population. Our cropland base finally stabilized at about 400 million acres in 1920. Credit improved farming methods, fertilization and tractors, which replaced draft animals. [USFS, J. Fedkiw, GTR RM-175, 1989] This yellow-poplar forest in North Carolina is emblematic of the change. It was once a cotton field.

How Have Conservation Policies Performed?

The best way to assess the performance of conservation policies is to look at the land, air and water, and the biological communities associated with them: what are they like today, as compared to what they were like in 1500, 1900, and 1970?

First a look at 1500:

The Conditions of 1500 vs. today

There is no question that when one compares the current biological diversity in the U.S. with that which is thought to have existed in 1500, there are profound differences. Cropland and pastureland alone account for 553 million acres (25 percent of the U.S. land area) that at one time were forests, grasslands, savannas and wetlands (Langner et al 1994). Most native grasslands and prairies in the humid areas of the U.S. have been converted to agriculture and other uses. More than one-half of American wetlands have been con-verted to other uses since 1500. At least 300 million acres of forestland (about one-third the estimated original area) have been converted to non-forest uses since 1500, mostly to agricultural uses.

The majority of eco-system transformation in the U.S. occurred during the settlement period, before 1900. The driving cause of the transformation was a rapidly growing human population combined with rather primitive agricultural and resource extraction and utilization technologies. Often unclear and fluctuating land tenure arrangements during the settlement period were also a factor.

The Conditions of 1900 vs. today

When one compares U.S. environ-mental conditions today with those that existed in 1900, there is no question that many significant gains have been made. The conservation policies and practices put into place in the early

decades of the 20th century, as well as some fortuitous events, have been major factors in reducing the rate of biodiversity loss since 1900. This has occurred in spite of an increase in U.S. population from 76 million to more than 260 million.

A number of wildlife species did become extinct due to human action since 1500. Examples include the great auk, passenger pigeon, heath hen, Carolina parakeet, ivory billed woodpecker, Bachman's warbler, Labrador duck, and others. A larger number of subspecies were also extirpated, including the eastern elk, Florida red wolf, eastern bison, Wisconsin cougar, and others. The genetic diversity of many other species and populations has likely been diminished, as well. Some of the earlier losses were due primarily to overhunting (great auk); many to a combination of overhunting and habitat loss (passenger pigeon, heath hen, Carolina parakeet); and some to habitat loss alone (Backman's warbler).

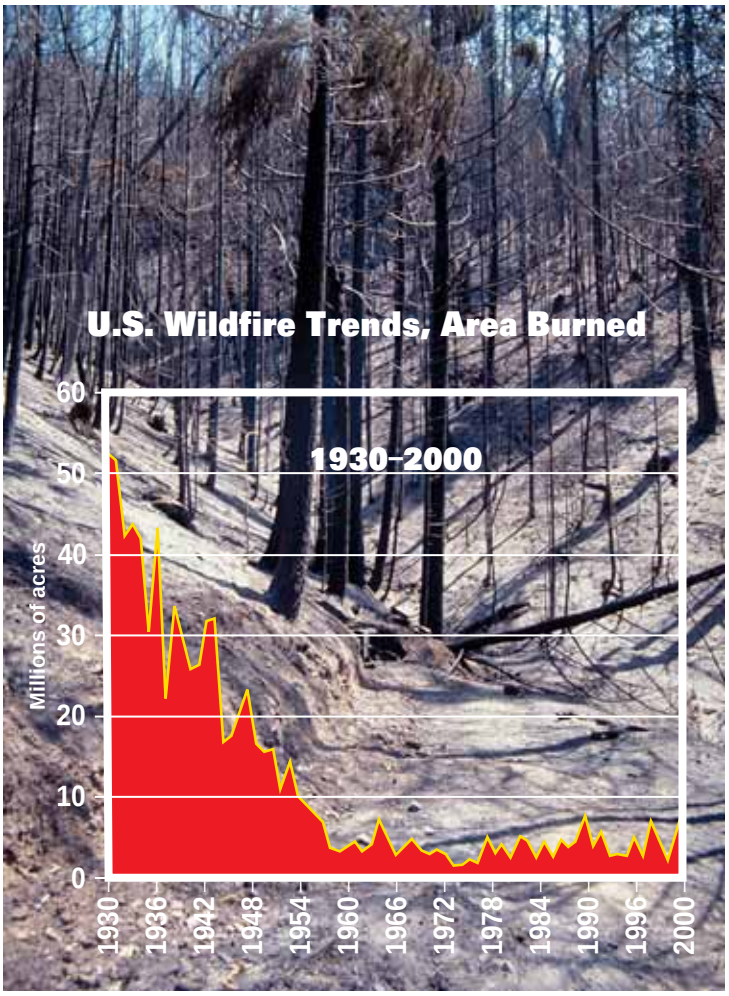
While a number of species did become extinct, given the massive assault on wildlife by market hunters and the transformation of U.S. ecological conditions that had occurred by 1900, it is perhaps remarkable that more extinctions did not occur. Many species that were severely depleted, or even on the brink of extinction in 1900, have staged remarkable comebacks. A large number of species that would likely have been on an endangered species list, had one existed in 1900, are today quite abundant. Examples include: wild turkey; egrets, herons, and many other wading birds; many species of shorebirds; wood ducks, and several other species of ducks; whistling swans; Rocky Mountain elk, black bears, beaver, fishers, and most other fur-bearers, pronghorn antelope, bighorn sheep, and white-tailed deer throughout most of its range. Many other species, although not actually threatened with extinction in 1900, are today both more abundant and more wide-spread than they were in 1900.

Many trends in U.S. forest conditions have, on balance, also been largely positive since 1900. U.S. forest area has been generally stable since 1920, when forest clearing for agriculture largely halted. In the northeastern U.S., forestland has actually increased substantially since 1900. As millions of acres of agricultural lands were abandoned, forests have increased in this, the most populous region of the nation, from less than half the land area to more than two-thirds, an increase of more than 40 percent, or 26 million acres (Final 1997 RPA Tables 2001).

Today forest cover encompasses about one-third of the U.S. land area and half the land area east of the Mississippi River. This is about two-thirds of the forest cover that is estimated to have existed in 1500 (MacCleery 1992).

American forests are, on balance, more mature than they were a half century ago. Because forest growth nationally has exceeded harvest and forest mortality for at least a half century, average forest biomass per acre in the U.S. has increased by at least one-third since 1950. In the East and South, biomass per acre has almost doubled since 1950. An exception to these general trends occurs in Pacific Coast forests, where the average biomass per acre has remained relatively stable from 1952 while the volume of trees greater than 17 inches in diameter dropped by one-third (USDA/Forest Service 2001).

The suite of tree and other woody species that today comprise U.S. forests are largely the same as those present in 1500, although the ages and relative proportions are often substantially changed. Introduced diseases have relegated some former widespread tree species to a minor component, e.g., American chestnut in the eastern hardwood forests. As of 1997, plantation forests constitute a relatively small proportion (about six percent) of U.S. forest area (Brooks 1993) (Final 1997 RPA Tables 2001). In contrast to many other countries, virtually all U.S. forest plantations are comprised of native species.



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Wildfires scorched 40–50 million acres a year during the 1930s, making fire control a national priority. By 1960, the area burned annually had been reduced by 90 percent. But wildfires are again gaining ground on federal lands. [Source: USFS Wildland Fire Statistics] Congressional failure to attack the two primary underlying causes—disease and stand density—is making a bad situation worse. This 1996 Nevada fire burned to bedrock killing everything in sight.

The U.S. of 1970 vs. today

Similarly to the late 1800s, the 1970s were a period of environmental awakening and concern. Some refer to this period as the second national conservation movement. Environmental concerns found focus in air and water pollution, and particularly concerns over how pesticide use and industrial pollution were affecting human health. Federal legislation enacted during this period reflects this concern. In enacting the National Environmental Policy Act (1970), the

Clean Air Act (1970), the Clean Water Act (1972), the Endangered Species Act (1973), the Toxic Sub-stances Control Act (1976), and the Safe Drinking Water Act Amendments (1977), Congress and the Admin-istration sought to protect environ-mental values while allowing for continued development and economic expansion.

The Clean Air and Clean Water Acts of the 1970s led to actions that resulted in substantial environmental gains: air quality has been steadily improving in U.S. cities. Sulfur dioxide emissions are down over 30 percent; lead emissions are down over 95 percent since 1970; and particulates are down over 80 percent since 1950 (CEQ 1989).

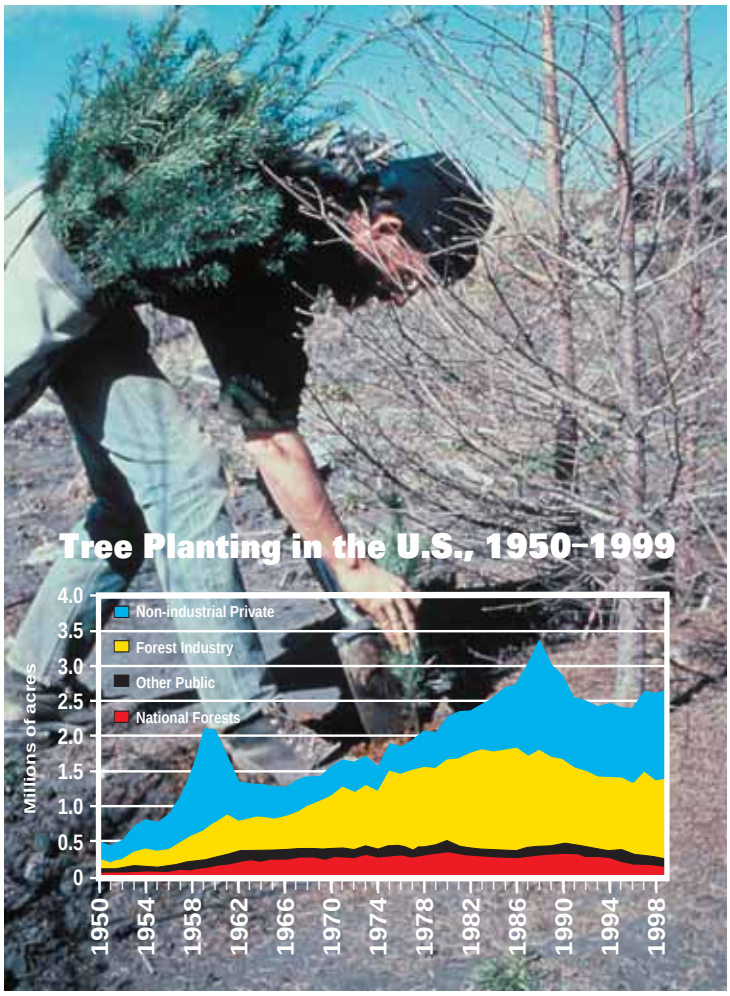
Most U.S. rivers and lakes are measurably cleaner than they were two decades ago. While perhaps justified for human health reasons, improved air and water quality have benefited both the human and non-human inhabitants of the planet, as evidenced by the improving populations of fish and aquatic wildlife in U.S. rivers and lakes. Fish and wildlife have staged significant comebacks in many rivers and lakes that were severely degraded or even biologically dead two decades ago. There have been increases in the populations of egrets, herons, osprey, geese, largemouth bass, and other fish and wildlife associated with the improved water quality of countless rivers and lakes across the country.

Improved water quality, in combination with elimination of the wide-spread use of persistent chlorinated hydrocarbon pesticides, have led to increasing populations of many raptors, such as bald eagles, peregrine falcons, pelicans and osprey, which had seen major declines during the 1950s and 60s.

Not all trends have been positive. Trends in 406 U.S. breeding bird species between 1966 and 1996 indicate that 27 percent are increasing, 25 percent decreasing, and there is no trend for the remaining 49 percent (Flather et al 1999). Many of the bird species that are declining belong to groups or "guilds" dependent upon specific habitat conditions and types, e.g., grassland habitats. Langner et al. (1994) reported that "(n)ative, endemic grassland birds declined in the past 25 years more consistently, and across a broader geographic range than any other group of birds. The substantial decline in grassland birds is confirmed by Robinson (1997). Meadowlarks, bobolinks, Henslow's sparrow, and upland sandpipers and other grassland birds have shown large and consistent declines. Other species which have shown declines are those that have specialized or niche habitats. For example, freshwater mussels, crayfish, amphibians, and some freshwater fishes lead the list of U.S. species at risk (Stein and Flack 1997). In the U.S., habitat loss and alteration and displacement by invasive exotics are leading causes of species endanger-ment (Stein and Flack 1997).

Neotropical migratory birds have also been the focus of concern. Of 132 neotropical migrants, 27 percent have shown population declines since 1966 (Flather et al 1999). Habitat fragment-ation is suspected as a cause for these declines. The modification of lower canopy layers by excessive populations of white-tailed deer may also be contri-buting to the decline of those neotropical migrants that nest in these habitats (Robinson 1997).

More than half of the wetlands in the coter-minous U.S. have been converted to other uses since colonial times. Wetlands have been reduced from an estimated 11 percent to about five percent of the land area of the coterminous U.S. (Dahl & Johnson 1991). Most of this loss occurred during the settlement period, but relatively large losses also occurred from the mid-1950s to the mid-1970s, when about 460,000 acres were being lost annually. From the mid-1970s to today, the rate of wetland loss has been progressively reduced. Flather et al (1999) estimated the annual wetland loss between 1982 and 1992 at 79,000 acres annually—a 70 percent reduction in the rate of wetland loss observed during the ten-year period from the mid-1970s to the mid-1980s, or a 0.07 percent average annual loss. Reductions in the rate of wetland loss can be attributed to increased understanding of the en-vironmental value of wetlands (as expressed in individual and federal and state regulatory action to protect wetlands). During the decade of the 1990s the main cause of wetland loss shifted from agriculture to urban expansion.



Prompt reforestation after harvest is a top priority for virtually all of the nation's public and private forest landowners. In fact, in many states—Oregon included—reforestation is legally required. Annual reforestation peaked at slightly more than 3 million acres in 1989. Since 1950, nearly 95 million acres have been replanted. [Source: R.J. Moulton, USFS; *Tree Planters Notes, 1999]* More than 18 million seedlings were planted on Weyerhaeuser land following the 1980 eruption of Mt. St. Helens.

Lessons of the Past Provide a Critical Foundation for the Future

Today, the U.S. has almost four times the population it had in 1900, living at a substantially higher standard of living. Yet our forests and wildlife are, in many of their major dimensions, in generally better condition today than they were a century ago.

U.S. forests and wildlife have demonstrated a resilience and responsiveness to management undreamed of by early conservationists at the turn of the century. These leaders were almost universally pessimistic about the future. In their defense, the concerns of early conservationists were logical and understandable given what they saw going on around them. Indeed, they were projecting what they felt would likely occur if past trends continued, and no actions were taken to address the concerns they raised.

But action was taken. New policies were debated and implemented. History has demonstrated that past public policies, coupled with the natural resilience of the resource, have generally served the country well.

America's forests were also the beneficiaries of a number of major technological changes that collectively acted to substantially reduce the pressure being placed on them to meet human demands. Conversion from wood energy to fossil fuels took a huge burden off American forests, particularly as population levels continued to grow. Today's farmers, on average, grow five times more food per acre that their grandfathers did in the 1920's. Because of this, the inexorable, three century-long conversion of U.S. forests to farmland largely halted in the 1920s.

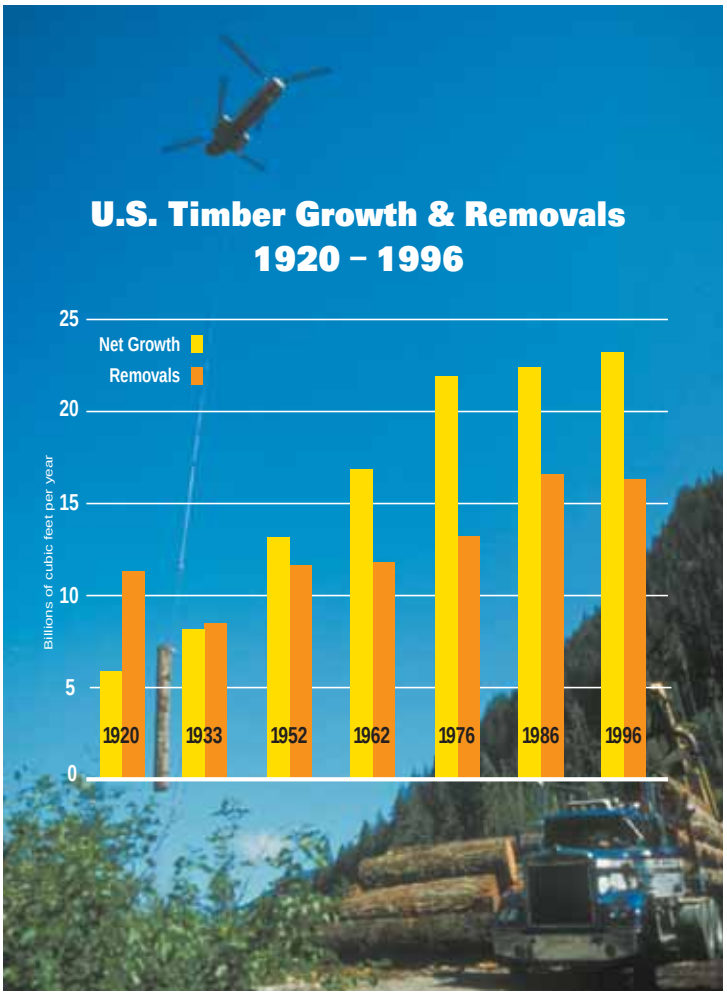
It is inevitable that as past issues have been successfully addressed, new issues and problems will emerge. Frequently identified issues in the U.S. include: reduction and fragmentation of late successional forest habitats because of timber harvesting; loss and degradation of riparian and wetland forest habitats; loss and deterioration of the forest and grassland habitats that once were created by frequent, low intensity fire; habitat fragmentation because of residential subdivision and urban development; effects of air pollution on forests in some areas; and displacement of native species by introduced exotics, to name a few. Of particular concern are rare and unique ecosystem types and species with specialized habitat requirements that are associated with them.

One of the most profound changes in American society in the 20th century has been its transition from a rural, agrarian society to an urban, industrialized nation. This change has been accompanied by a corresponding physical and psychological separation of its people from the land that sustains them.

In a world of farms, forests, and small towns, the linkages between food and fields and between forests and home and hearth were clear and sustained by personal experience. In a world of cities and suburbs, of offices and air conditioning, those linkages have become more obscure, and for many people, virtually non-existent. Yet today's urbanized society is no less dependent upon the products of its forests and fields than were the subsistence farmers of America's past.

Yet society remains dependent upon forests for a wide variety of economic products. Indeed, utilization of forests for products has never been higher than it is today on a wood volume basis. Today, the U.S. consumes about as much wood on a tonnage basis as the total for most other raw materials combined—steel, plastics, aluminum, other metals, and cements.

The debate over the use of forests has intensified several trends: 1) a substantial reduction in timber outputs from federal and other public lands, 2) an increasing use of high yield plantations on private lands, and 3) increased imports of forest products from other countries, particularly from Canada. These trends raise complex economic, social, environmental and even ethical and moral issues that will need to be addressed by the public, policy-makers, and forestland managers in the early 21st century as they continue to explore the road to sustainability.



Columbia Helicopters

In 1920 harvest from America's forests was nearly twice the growth rate. But today growth exceeds harvest by a comfortable margin, and has since the early 1960s. Credit conservation measures and steadily increasing forest productivity on private forestlands. [Source: *Forest Resources of the United States*, 1997; GTR-NC-219, USFS, 2001; TIM].

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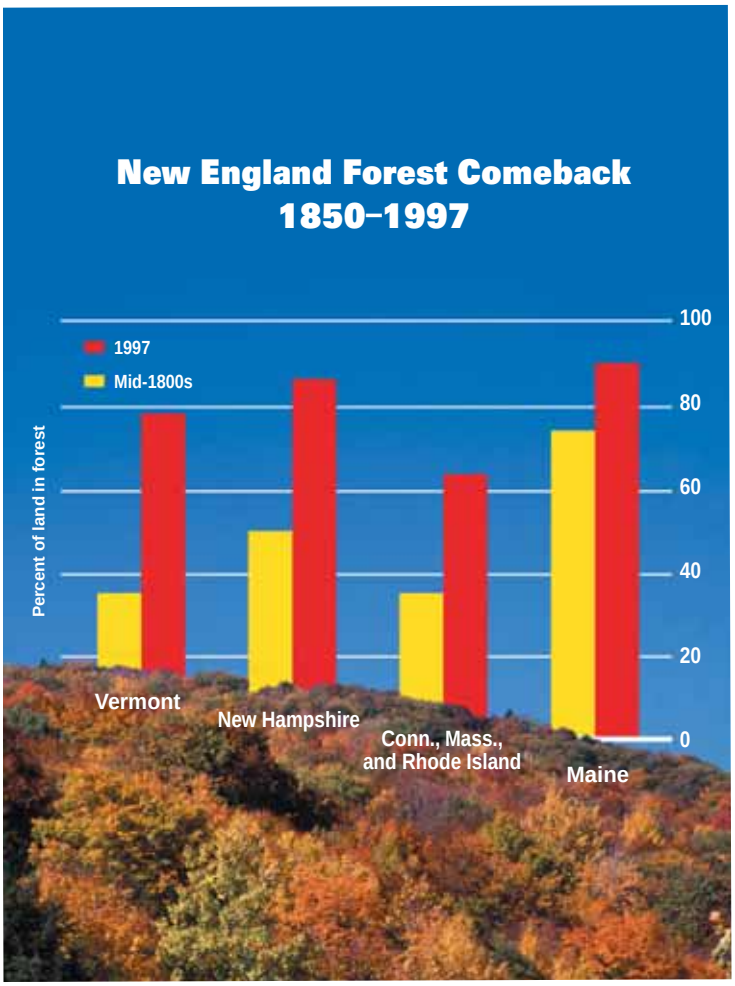

Jim Petersen

Few stories more vividly underscore the nation's progress in conservation and forestry than the much celebrated "return" of the New England forest. Land clearings for farming and livestock took a heavy toll on forests in Vermont, Connecticut and New Hampshire. By the mid-1800s less than half the region was still forested, but today 79 percent is forested again. [*Regional Silviculture of the U.S, 1980, Forest Resources of the U.S., 1997 and GTR-NC-219, 2000]*

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U.S. Forests, Wildlife, 1900-2000

Editor's Note

It is a measure of both the inherent resilience of our forests, and of the success of the policies that were put in place in response to public concerns in the early decades of this century, that forest conditions over much of the U.S. have improved dramatically since 1900. The following is a snapshot of the forest and wildlife situation that existed in the 1900s, as contrasted to 2000:

1900

• In the early 1900s, wildfire commonly consumed 40-50 million acres annually, an area the size of Virginia, West Virginia, Maryland, and Delaware combined.

• Due largely to such wildfires, there were perhaps 80 million acres of "cutovers" which continued to remain idle and unstocked or poorly stocked with desirable tree species.

• By 1900, many wildlife species, which formerly were abundant, were severely depleted or were on the brink of extinction. Examples included game animals, such as white-tailed deer, wild turkey, pronghorn antelope, moose, bighorn sheep, and, of course bison. Furbearers, especially beaver, had been eliminated from significant portions of their ranges. Waterfowl were also severely impacted, including wood ducks, and several other species of ducks; Canada geese; all manner of plumed wading birds, such as herons, egrets, ibises, and others.

• The volume of timber harvested, nationally, greatly exceeded that of forest growth.

• Clearing of forests for agriculture continued at very high levels. In the last decade of the Century, America's farmers cleared forests at the average rate of 13.3 square miles per day. In the five decades ending in 1900, forest cover in many areas east of the Mississippi had been reduced from 60-70 percent of the land to 20 percent, or even less in some areas. Many of the areas being cleared were on steep slopes, were marginal for growing crops, and often were highly erodible.

• No provision for reforestation was being made. In fact, no long-term forest man-agement of any kind was being practiced.

• Large quantities of wood were left after logging, sawmills were inefficient, use of wood in buildings was based on custom, rather than sound engineering, and huge volumes of wood were lost to rot and deterioration.

• Large-scale disastrous flooding in the east was tied to farm clearing and to logging and wildfires.

2000

The area consumed by wildfire has been reduced by more than 90 percent, from 40-50 million acres in the early 1900s to 2-8 million acres today—even in bad fire years.

• The cutovers or "stumplands" thatexisted in 1900 have been reforested. Today, many of these areas contain mature forests. Others have been harvested a second time and regenerated to young forests.

• Wildlife has been a major con-

USFS

Streambed jammed with logs waiting spring flooding, a practice no longer tolerated.

Jim Petersen

Millions of shore birds were killed for their feathers, which adorned women's hats.

Peter Koch

Killer wildfires decimated 40-50 million acres of virgin forestland every year.

Jim Petersen

The nation's elk population has increased 10-fold since 1930.

Bonneville Power Administration

Forests have returned as per acre cropland productivity has increased.

Jim Petersen

Hi-tech wood pellets: Wood utilization is nearing 100 percent.

servation success story. While a number of species, such as the great auk, passenger pigeon, heath hen, and several others, did become extinct, many others that were severely depleted, or even on the brink of extinction in 1900, have staged remarkable comebacks. Many species that would likely have been on the endangered species list, had one existed in 1900, are today abundant. Examples include: wild turkey; beaver; egrets, herons, and many other wading birds; many species of shorebirds; wood ducks, and several other species of ducks; whistling swans; Rocky Mountain elk, pronghorn antelope, bighorn sheep, black bear; even white-tailed deer throughout most of its range.

• Nationally, forest growth rates have exceeded harvest rates since the 1940s, with each decade generally showing a greater margin of growth over harvest than the one preceding. By 1986, the volume of tree growth nationally exceeded the volume harvested by 37 percent; and growth was more than 3 1/2 times what it had been in 1920.

• For the last 70 years there has been no increase in cropland area. About 1920, for the first time in American history, the increase in the area of cleared farmland abruptly stopped, rather than continuing to rise at the rate of population growth.* While farm clearing of forests continued after 1920 in some areas, it was offset by farmland abandonment and reversion back to forest in others. The stabilization in the area of cleared farmland had an immensely beneficial effect on U.S. forests.

• Tree planting on all forest ownerships has increased dramatically after World War II, and was at record levels throughout the 1980s. Many private forestlands are now actively being managed for tree growing.

• The efficiency of wood utilization has improved dramatically since 1900. Much less material is being left in the woods, many sawmills produce twice or more the usable lumber and other products per log input they did in 1900, engineering standards and designs have reduced the volume of wood used per square foot of building space, and preservative treatments have substantially extended the service life of wood. All of these have reduced by millions of acres the area of annual harvest that otherwise would have occurred.

• Eastern watersheds have been reforested. The headwaters of many American rivers are protected from over harvesting by National Forests and other public lands.

* The area of cropland stabilized for two primary reasons:

1) Rapidly increasing numbers of motor vehicles and farm tractors made it unnecessary to continue to raise large numbers of draft animals. In 1910, there were about 50 million horses, mules, and other draft animals in the U.S. Fully 27 percent of all cropland was devoted to growing food for draft animals. By 1950, the numbers of draft animals had dropped so dramatically, compared to 1910, that the equivalent of some 70 million acres of cropland had been released to grow crops for human consumption, and

2) After 1935, spurred by the development of genetically improved hybrid crops and by expanded use of chemical fertilizers and liming, crop yields finally began to improve. Corn yields are typical—between 1800 and 1935, average corn yields in the U.S. remained virtually flat at about 25 bushels per acre, but they had increased to 35 bushels by 1945, to 40 bushels by 1950, and to 120 bushels by 1988. American farmers now grow as much corn on one acre as it took five acres to grow in 1920.

Conservation Policies Improve

A number of forest policies emerged as national goals and priorities in response to public concerns. The success of those policies depended upon effective cooperative relationships among federal, state, and local governments, as well as private forest landowners and other private sector interests.

The policies and priorities that had the greatest effect on the improved condition of our forests are the following:

- Focusing on fire suppression, prevention, and public education to protect the forest;

- Establishing and enhancing the profession of forestry, and later of wildlife management, hydrology, and other natural resource disciplines, through establishment of accredited natural resource schools, professional societies, etc.;

- Improving the art and science of forest regeneration and management, including research, establishment of tree nurseries, and providing technical and financial assistance to forest landowners;

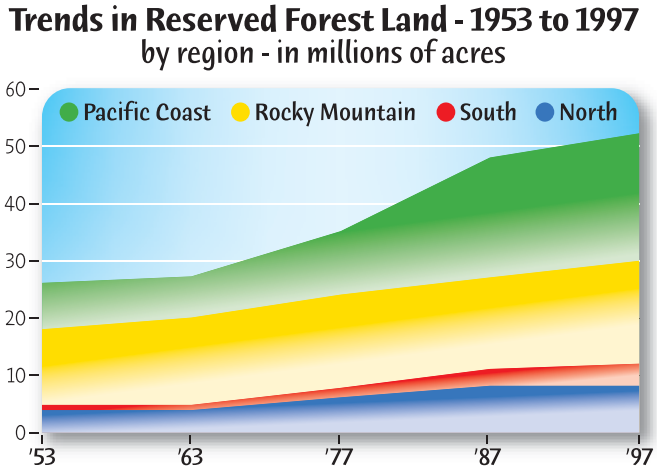
- Improving the efficiency with which wood products are utilized in the woods, at the mill, and in end-product applications. Such gains are the result of wood utilization research, its effective application, and the incentive created by increasing real prices for forest products. The Forest Service's Forest Products Laboratory in Madison, Wisconsin, established in 1910, has been a significant contributor over the years to expanding the technical knowledge necessary for improving the utilization of wood products;

- Improving the quality of forest management on private lands by improving economic incentives and removing tax and other disincentives;

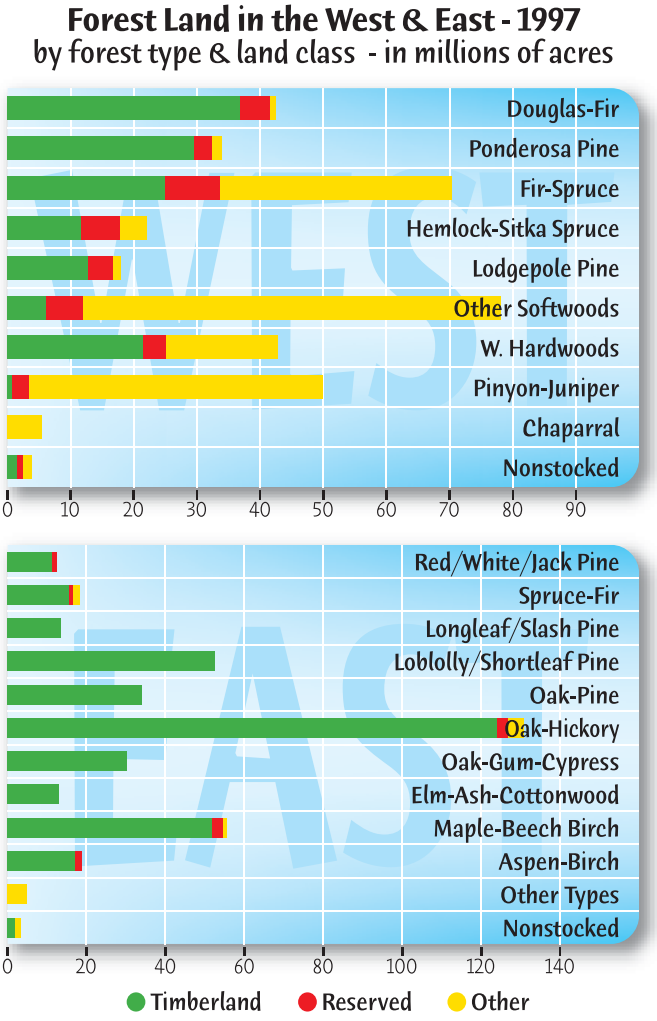
- Establishing the Forest Reserves (later the National Forests) for watershed protection, irrigation, and sustained timber production.

- While not established for forestry purposes, one policy that nonetheless had a significant beneficial impact on the nation's forest resources was the strategic decision made in USDA in the early decades of this century to emphasize agricultural research aimed at increasing crop yields. Prior to that, USDA primarily focused on statistical reporting, soil and farm implement testing, and related activities.

- An additional factor that has had a significant positive effect on forest conservation has been the increasing real price of wood over the decades. Between 1850 and 1950, the real price of lumber, and of standing timber, increased by more than five times, adjusted for inflation. This has created powerful economic incentives both for growing and managing forests and for reducing consumption of wood by using it more efficiently. The power of such economic incentives for conservation and efficient use of the resource by the private sector was largely unrecognized by early conservation leaders.



Trends in Reserved Forest Land by Region [USFS, *Forest Resources of the United States*, 1997; GTC-NC-219, 2001]



Reserved Forest Land, East and West, by Forest Type and Land Class [USFS, *Forest Resources of the United States, 1997*]

Forests and Wildlife Conditions

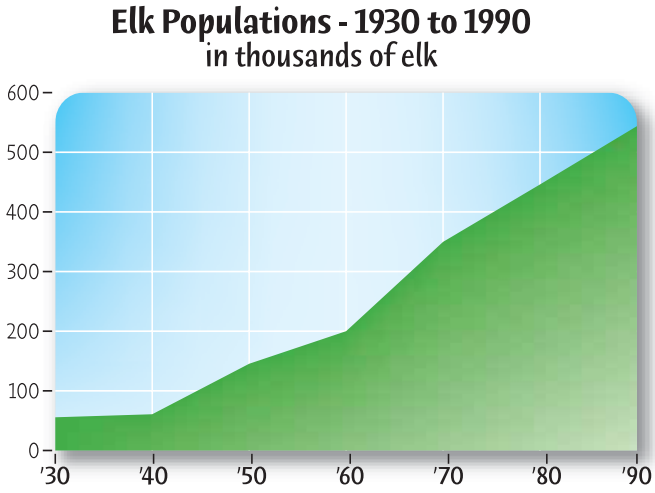
A significant factor in the conservation of the nation's wildlife was the establishment and proliferation in the late 1800s of politically active sportsmen's organizations. These groups waged a protracted, and ultimately successful, war against market hunting. They also vigorously supported the enforcement of game laws, self-taxation to support state game management, and acquisition of habitat reserves and management areas.

The policies and other factors that had the greatest effect on the improved condition of U.S. wildlife are the following:

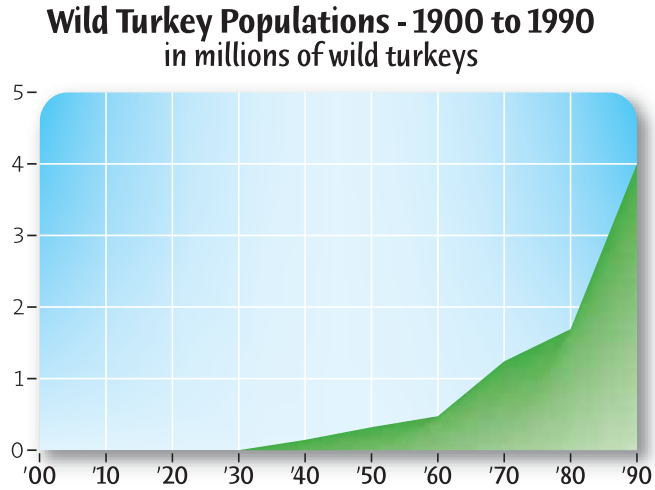
- Adoption of a variety of strong state and federal wildlife conservation laws, and the establishment of the agencies effectively to enforce them. This game law framework includes the following:
  • Halting market hunting of wildlife for meat and most other products, including feathers (market hunting of furbearers has continued under state regulation);
  • Eliminating spring shooting of waterfowl and other game birds;
  • State regulation of resident game and non-game species;
  • Prohibition under federal law of: a) hunting of song birds, plume birds, and other migratory non-game birds, and b) interstate commerce in wildlife products taken in violation of state law;
  • Federal regulation of sport hunting of waterfowl and other migratory game birds;
  • Federal protection of endangered and threatened species after 1966.

- Improving the art and science of wildlife management.

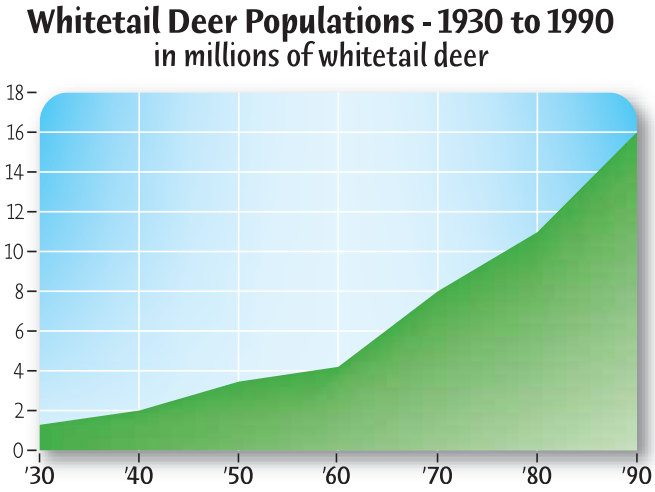
- Establishing professional state fish and game departments devoted to scientific wildlife management and game law enforcement.



Trends in Elk Populations, 1930-1990 *[USFS, A. Christensen, Elk in North America]*



Trends in Wild Turkey Populations, 1900-1990 [Wild Turkey Federation]



Trends in Whitetail Deer Populations, 1930-1990 [American Forestry Association, Chapter 8, Jack Ward Thomas]

- Improving habitat conditions, especially in the East and South, where millions of acres of agricultural land have reverted back to forest.

- Reintroductions of species into formerly occupied range.

- Establishing about 90 million acres of National Wildlife Refuges and 4 million acres of state wildlife reserves. Wildlife refuges and reserves in the contiguous 48 states were financed largely by hunting license fees and taxes on sporting arms, ammunition, and equipment.

- Establishing the National Forests, National Parks and other federal and state lands for conservation objectives:
  • In the West, National Forests and Parks acted as wildlife reserves by providing protection for beleaguered populations of many wildlife species, especially large game, until state and federal wildlife programs and enforcement was put in place in the 1930s and beyond. The National Forests were the source of animals for a number of later reintroductions into formerly occupied habitat elsewhere.
  • East of the Mississippi, millions of acres of abandoned and depleted farm and forest lands became National Forest lands after 1920. After acquisition, feral cattle, dogs, and goats were eliminated and the land rehabilitated. Today, these areas provide superb habitat supporting rich populations of many wildlife species, some of which had not existed on these lands since before the American Revolution.
  • The multiple use mandate of the 191-million acre National Forest System lands provides for full consideration of wildlife values and objectives in land management decisions. It has also encouraged the development of highly constructive joint efforts with state wildlife agencies in the management of wildlife habitats and populations.

A Graphic Perspective on Public and

Land Area in the U.S. - 1997
by major class & region - in thousands of acres

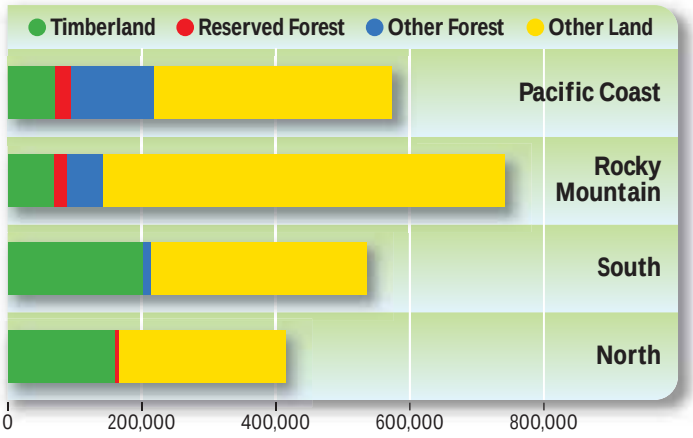


FIGURE 1

Forest Land Area in the U.S. - 1997
by productivity class & region - in thousands of acres

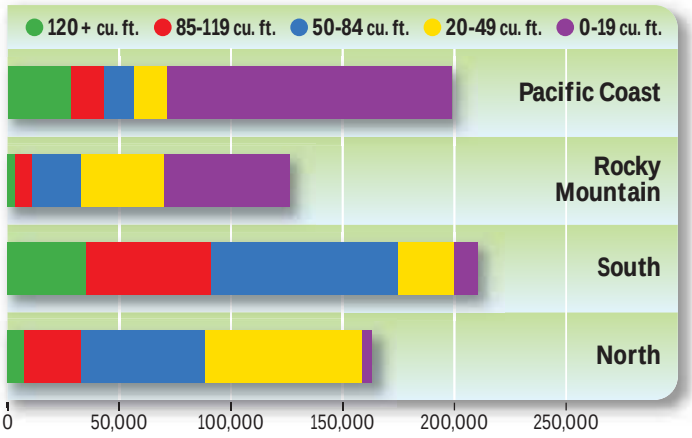


FIGURE 4

Who Owns the Most Timber?

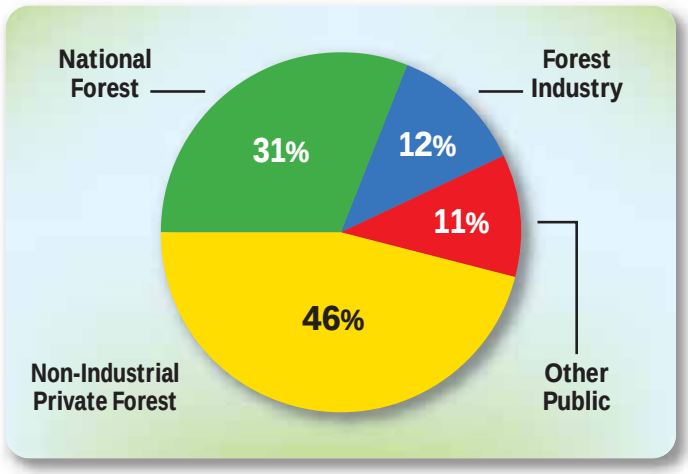


FIGURE 2

Forest Growth Per Acre - 1952 to 1996
by owner group - in cubic feet/acre/year

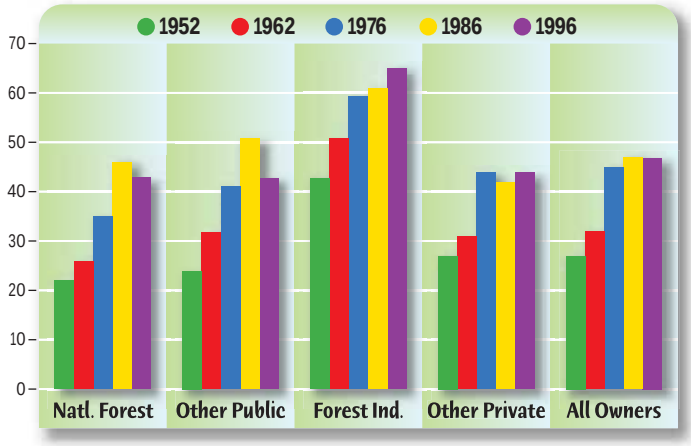


FIGURE 5

Timberland in the U.S. - 1997
by owner group & region - in millions of acres

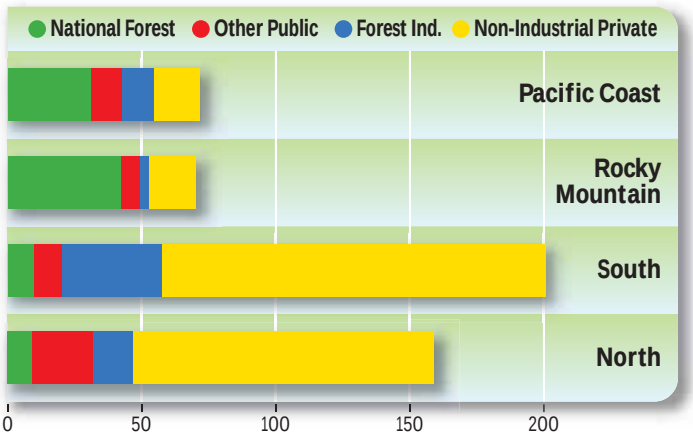


FIGURE 3

Average Standing Timber Volume - 1953 to 1997
all owners by region - in cubic feet per acre

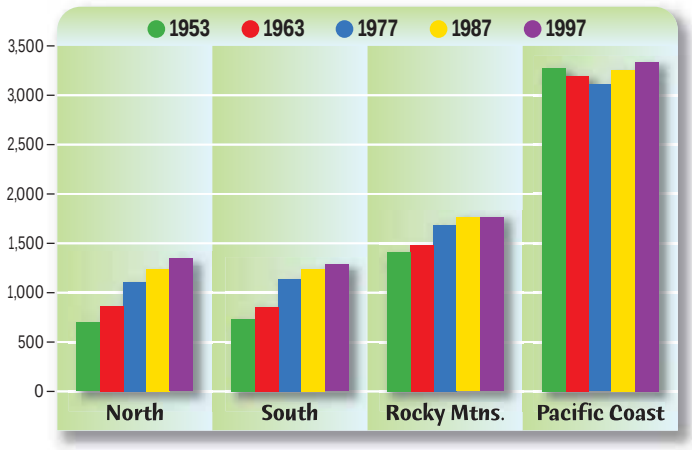


FIGURE 6

[1] All of the charts on these two pages are from *Forest Resources of the United States; 1997,* a USFS report by W. Brad Smith, John S. Vissage, David R. Darr and Raymond M. Sheffield; and GTR-NC-219, 2001

d Privately-owned Forests in the U.S.[1]

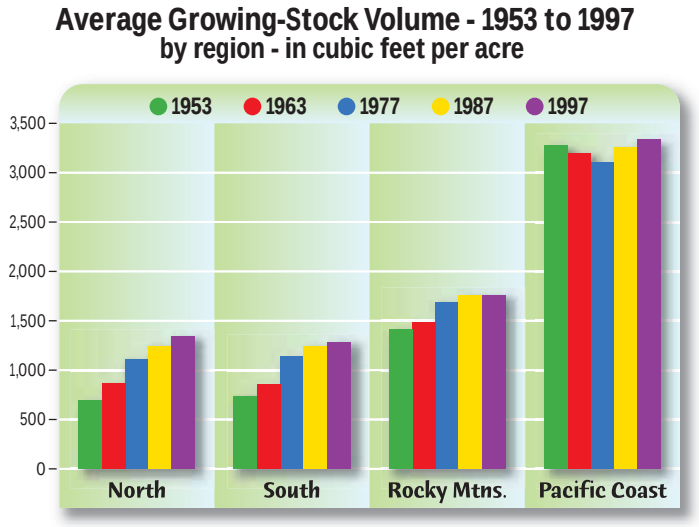


FIGURE 7

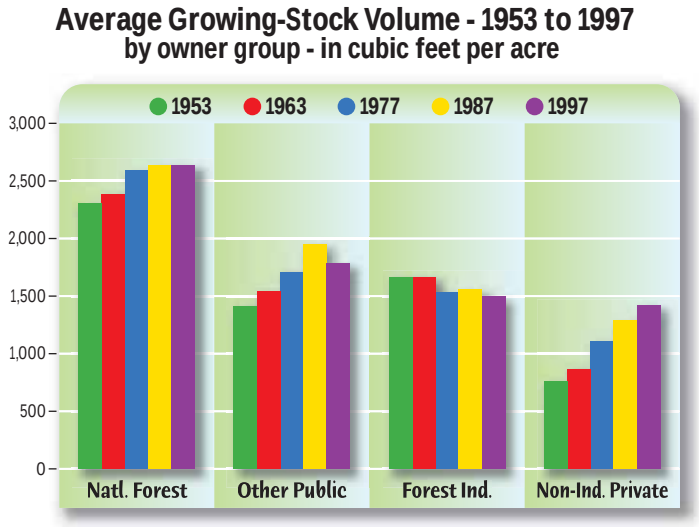


FIGURE 10

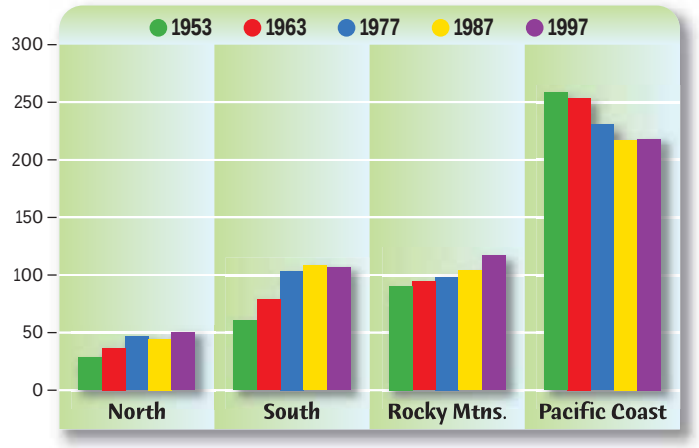


FIGURE 8

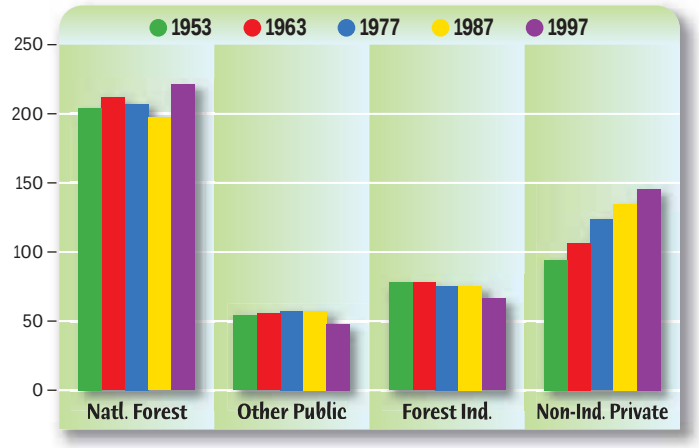


FIGURE 11

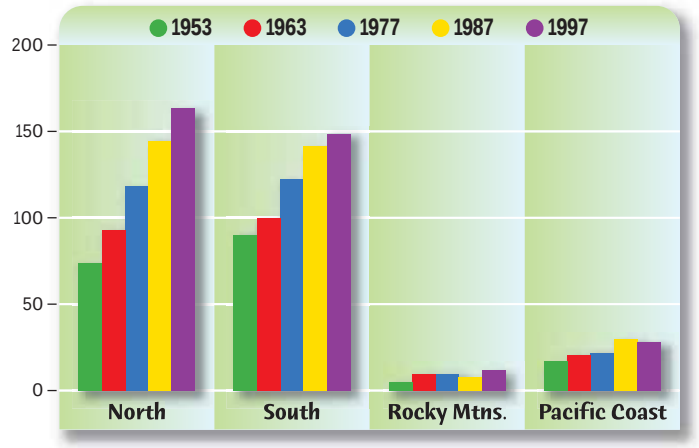


FIGURE 9

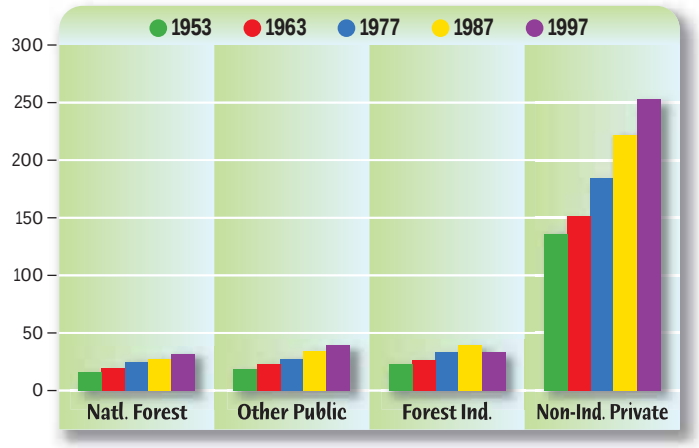


FIGURE 12

Western National Forests:

SOFTWOOD RESOURCE CONDITIONS AND MANAGEMENT IMPLICATIONS

By Dr. Jay O'Laughlin, Director, Policy Analysis Group, University of Idaho

National forests are assets of immense value, including almost half of the nation's softwood timber resources. Widespread and severe wildfires put a range of ecological, environmental, economic and social values at risk, and raise questions about the health and sustainability of national forests. The softwood resource is analyzed because western forests are mostly (90%) softwoods, and most of the national forests (82%) are in 12 western states.

• **Objective.** The main purpose of this report is to provide an objective statistical information base about western national forest conditions. Recent USDA Forest Service publications provide data from 1952 to 2002. These data have implications for management policy decisions, which are identified anddiscussed primarily by citing various publications.

• **Background.** More than a century ago political leaders had the foresight and courage to carve out of the public domain a system of national forest reserves "to improve and protect the forest within the boundaries, or for the purpose of securing favorable conditions of water flows and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States."[1] During the administration of President Theodore Roosevelt the system was expanded, renamed the national forests, and placed under the stewardship of the newly created Forest Service in the U.S. Department of Agriculture. National forests are to provide sustained flows of various values, products, and services "in the combination that will best meet the needs of the American people."[2] Many people enjoy the clean water, wildlife, and recreation opportunities the national forests provide, and many benefit from the timber, minerals, and livestock forage. The National Forest System consists of 191.6 million acres, or 8.5% of America's lands. Forests cover 77% of the system lands, located in 44 states. Seven states each have more than ten million acres of national forests. Another 17 have more than one million acres each, and 16 other states have at least 100,000 acres.

• **Methods.** President Roosevelt believed the national forests were a good investment for the nation, and that their usefulness could be increased by "thoroughly businesslike management."[3] An inventory of assets is an essential part of any business plan. Fifty years ago the Forest Service began assembling periodic forest inventory data for all forest ownerships,

Aftermath of the stand-replacing Viveash Fire in New Mexico's Santa Fe National Forest

Jim Petersen

from which regional and ownership trends for softwood and hardwood resources can be developed. *National Inventory Data*[4] are used to identify trends in softwood resource conditions on western national forest timberlands over the past 50 years. As there are no standards against which to compare data, comparisons with other ownerships and regions provides context for the analysis. *Measuring Forest Health* provides objective statistics derived from inventory data.[5] Forest health conditions are compared across ownerships and regions using three statistics derived from inventory data:

- Forest density, measured as total growing stock volume (all softwood and hardwood trees > 5" diameter) per acre of timberland;
- Softwood mortality rate, a forest health indicator when mortality is expressed as a percentage of growth; and
- Softwood growth/removal ratio, an estimate of the physical sustainability of timber harvests. *Western National Forest Conditions* are examined in depth by comparisons across ownerships in the Pacific Coast and Interior West regions. Statistics are then related to *Forest Health Problems and Management Implications* as currently discussed in various publications. The main points from the analysis are listed as *Conclusions*. Appropriate references are cited with *Endnotes*.

National Inventory Data

The Forest Service collects data on the nation's forests and timberlands and reports it by ownership and region. Timberland is a subcategory of forest land where it is physically and administratively possible to grow continuous crops of industrial timber. Timberland inventory data include numbers of acres and volume of softwood and hardwood growing stock. Inventory change factors in the data base are tree growth, mortality (from fire, insects, diseases and other non-human causes), and removals, mostly from timber harvesting. Half of all National Forest System lands are classified as timberlands. Resource managers cannot harvest timber on the other half. National forest timberlands do not include any of the 52 million acres of federal forests reserved from timber harvesting, most of them in the National Wilderness Preservation System established in 1964. Also excluded are 105 million acres of low productivity boreal forests in Alaska and 42 million acres of western pinyon/juniper woodlands.

- **Softwood Trends by Ownership.** National forests have 20% of the nation's forest lands, and 19% of the timberlands (Figure 1). Statistics from here on are only for timberlands. Softwood timber comprises 56% of the nation's inventory across all categories of ownership; the remainder is hardwood (Figure 2). Timber resources—by definition, a resource is something humans use—provide raw materials for an industry employing 1.8 million Americans.[6] Softwoods comprise 61% of removals, or timber harvests (Figure 2). National forest timberlands hold 46% of the nation's softwood timber resources and provide 6% of the harvest (Figure 3). For the past 50 years national forests have maintained approximately the same proportion of the nation's softwood inventory (Figure 4). Since 1986 the annual softwood timber harvest from national forests has diminished by 70% (Figure 5). The Forest Service attributes the reduction to conservation of habitat for species imperiled with extinction and protected by the Endangered Species Act of 1973.[7] The ESA gives regulatory agencies decision authority over most Forest Service land management activities in the West, and provides a way for people to seek judicial review of Forest Service projects.

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Mortality is nearing 100 percent in this Nez Perce National Forest lodgepole pine beetle infestation near Elk City, Idaho.

- **Softwood Trends by Region.** The West has the top seven states in softwood inventory, led by Oregon, Washington, and California (Figure 6). Fourth and fifth are Idaho and Montana, which in combination have as much softwood as Oregon. Sixth and seventh are Alaska and Colorado. The next three leading softwood states are in the South (Georgia, Alabama, North Carolina). Added together, the top three southern states have a quantity of softwood equivalent to either Idaho or Montana. Maine tops the North and ranks eleventh nationally. The top 12 national forest states are in the West, with the northwestern states of Alaska, California, Idaho, Montana, and Oregon leading in acreage (Figure 6). In the West, 34% of all forest lands, and 54% of all timberlands, are national forests. The two western regions hold two-thirds (68%) of the nation's softwood inventory from which comes less than one-third (28%) of the softwood timber harvest (Figure 7). The South can claim to be the dominant softwood resource region because with 22% of the nation's softwood inventory in it's mixed softwood/hardwood forests, the South provides 65% of the softwood timber harvest. The inventory/removals disparity in the West is related to the large proportion of national forest ownership. Softwood inventories are increasing in all regions except the Pacific Coast (Figure 8). The Pacific Coast states have 43% of the nation's softwood inventory, down from 59% in 1953. Except for Alaska, states in this region—California, Oregon, Washington—have the most productive timberlands in the northern hemisphere. Idaho and Montana have the most extensive and productive forests in the Interior West, with 51% of the timberland area and 61% of the softwood inventory.

Measuring Forest Health

National forest timberlands are not managed primarily for timber production. In response to environmental laws, the Forest Service now "focuses on the long-term health of the land."[8] Are national forests "healthy"? First one must understand what "forest health" is, and how it can be measured. Then one can make informed pronouncements about forest conditions, forest health problems, and management implications. Forest health is an imprecise term conveying various concerns people have about a forest's ability to provide two general types of values: first, values a forest provides through its conditions and functions, and second, values that are direct and tangible contributions of a forest to the

quality of human life.[9] Forest health is a perceived condition derived from concerns about forest age, structure, composition, function, vigor, presence of unusual levels of insects and disease, and resilience to disturbance. Perceptions and interpretations of forest health are influenced by individual and cultural viewpoints, land management objectives, spatial and temporal scales, stand conditions, and the appearance of a forest at a point in time.[10] Forest health indicators can be developed from forest inventory data. Three are used here: 1) forest density, 2) the relationship of forest growth and mortality,[11] and 3) the relationship of forest growth and removals, a coarse-filter measure that approximates the idea of sustainable production.[12] Growing stock volume and three factors that change inventory volume—annual growth increment, mortality, and removals—are collected as part of the periodic forest inventory conducted by the Forest Service. Averaged across all ownerships and regions, softwood growing stock volume increased 14% in the past 50 years. Annual growth of softwood (net of mortality) in 2002 was 77% higher than in 1953, annual softwood mortality was 35% higher than 50 years ago, and annual softwood removals increased 30% between 1952 and 2001.[13] Relationships and trends in these data can be used to objectively describe the condition of forest growing stock by ownership and region.

• **Forest Density Trends.** The density of forests affects productivity.[14] Trees compete for moisture, nutrients, growing space, and light. Too much growing stock means tree vigor will be less than optimal as limited resources for each tree are reduced, affecting growth and mortality processes. Growing stock volume per acre is a measure of density that can be derived directly from forest inventory data provided in widely distributed Forest Service reports. Hardwoods and softwoods on the same site compete for the same resources, making it necessary to use total growing stock volume, not just softwoods. Forest density averaged across all ownerships and regions has increased 40% during the past 50 years. By ownership, national forests are at least 50% denser than any other ownership (Figure 9). By region, Pacific Coast forests are 79% denser than Interior West forests, which are at least 36% denser than forests in the North or South (Figure 10).

• **Softwood Mortality/Growth Trends.** Along with removals, mortality and growth are the major forest change factors. Statistical analysis of inventory data shows mortality rates correlated with forest density (significant at the 0.01 level); i.e., denser forests have higher mortality rates. By ownership, national forests have had higher mortality rates than other ownerships in every periodic inventory since 1953, and the rate is now 61% higher than any other ownership (Figure 11). Although mortality rates increased on all ownerships since 1987, the rate of increase on national forests is the highest. By region, in the past 15 years softwood mortality rates have increased in the Interior West and North, whereas rates decreased in Pacific Coast forests (Figure 12). Because the North has a relatively small amount of national forests, that story, featuring air pollution and exotic insects,[15] is best told elsewhere. Forests in the South have not exhibited increased mortality rates at this scale of analysis.

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The Moose Creek Fire in Montana's Flathead National Forest destroyed more timber than all of the timber that has ever been harvested on this forest.

• **Softwood Growth/Removal Trends.** The idea of sustained-yield forestry is that timber harvests in a given year generally should not exceed annual forest growth. This traditional sus-tainability measure is expressed as a ratio of net annual growth (i.e., net of annual mortality) to annual removals. Removals consist almost entirely of timber harvests plus associated logging residue or slash. By ownership, national forests broke from the pack in 1987, reaching a ratio of 5.4 in 1997 and 2002, more than double the next highest ratio of 2.2 (Figure 13). By region, trends show the South right at the brink of sustainability, at 1.0 in 2002 (Figure 14). Trends also reveal the change from an unsustainable to sustainable condition in the Pacific Coast region in 1987, as slower-growing older trees on public and forest industry lands were harvested during preceding periods. The growth/removal ratio in 1987 ranged between 0.8 and 2.3 across all ownerships and regions (Figures 13 and 14). The reduction of national forest timber harvests during the 1990s increased the Pacific Coast regional ratio from 1.1 to 1.8, while the ratio in the Interior West region increased from 2.3 to 3.7 (Figure 14). The level of timber harvests on western national forests in 1987 was such that growth exceeded removals, with Pacific Coast national forests at 1.2 and Interior West at 2.8 (Figure 15). National forest ratios are now extraordinarily high in the Pacific Coast (6.7) and Interior West (9.0) (Figure 15). Additional analysis of these conditions is warranted.

Western National Forest Conditions

• **Pacific Coast Region.** National forests are at least 40% denser than any other ownership in the Pacific Coast (Figure 16). National forests hold the majority of softwood inventory (58% in 2002) and began adding to that inventory in 1987 after reductions in previous periods (Figure 17). Removal trends indicate that the Forest Service, other public agencies, and forest industry firms drew down their softwood inventories until 1986 (Figure 18). Removals increased from 1952 to 1986, then diminished on national forests by 78% between 1986 and 1996, with further reductions to 2001 (Figure 18). Mortality rates decreased on all ownerships over the past 50 years (Figure 19). This is likely the result of harvesting older, larger, slower-growing trees. The mortality rate on national forests remains above the average for all ownerships because the older trees in national forests grow more slowly and tree mortality is often high in older stands. In summary, national forests are 47% denser and have a mortality rate 50% higher than other ownerships (Figure 20).

• **Interior West Region.** National forests are at least 33% denser than any other ownership in the Interior West (Figure 21). This region has about half of the amount of softwood inventory as the Pacific Coast region, but a larger proportion of it (75% in 2002) is in the national forests (Figure 22, which for comparison is drawn to the same scale as Figure 17). Inventory has been increasing for the past 50 years in the national forests, and at an increasing rate since 1987 (Figure 22). The reduction innational forest timber harvests between

1986 and 1996 (72%) is similar to the Pacific Coast region, and has also continued to diminish (Figure 23). Accompanying the reduction in harvests and buildup of inventory is an increase in mortality. Although mortality rates increased on all ownerships since 1986, the national forests increased at a substantially higher rate (Figure 24). In 2002 mortality in the region was the highest rate in the nation (Figure 12) because of the national forests, which had the highest mortality rate (42%) of any region and ownership reported since 1962 (52%, Pacific Coast national forests, Figure 19). In summary, national forests in the Interior West are 63% denser and have a mortality rate 80% higher than other ownerships (Figure 25).

Forest Health Problems and Management Implications

Are western national forests "healthy"? Maybe not. Forest density, mortality/growth rates, and growth/removal ratios are higher than in other regions and also higher than other ownerships within the region. This could be a problem if national forest lands are expected to provide a variety of values, products, and services for people. At least 50.4 million acres of national forests are at high risk of severe forest fire, with 80% of that acreage in the West.[16] In parts of the West national forests have become more susceptible to outbreaks of insects and diseases as well as severe fire.[17] To a large degree, these forest health problems contributed to the severity of some of the wildfires in 2000, which were some of the worst in the last 50 years.[18] Such fires not only pose danger to people, but severe, long-lasting damage is likely to result to wildlife and watersheds when a fire burns, particularly in drought years.[19] Forest health directly affects watershed conditions, including water quality, by regulating the amount, timing, and sedimentation of runoff.[20] Severe fires put ecological values at risk, including water quality and species recovery, as well as homes in rural areas.[21] The most extensive and serious problem with the health of national forests in the Interior West is the over-accumulation of vegetation, which has caused an increasing number of large, intense, uncontrollable, and catastrophically destructive wildfires.[22] According to the Forest Service, forests have accumulated an "unnatural build-up" of fuels, setting "conditions for unnaturally intense fires that threaten communities, air, soil, water quality, and plant and animal species."[23] Forest Service scientists have been warning of the fuel buildup for at least 30 years.[24] The Forest Service expects removals from national forests to remain near today's levels during the next 50 years, with increases in annual growth increments and mortality.[25] This means denser forests than today, with more dead wood in them. Many western forests are already too dense, with more trees than the site can support.[26] For example, reducing overly dense ponderosa pine stands is a pervasive forest restoration problem.[27] Inaction or passive management will allow some forest health problems to worsen.[28] Scientists anticipate increased fuel accumulations, lengthened fire seasons, and intensified burning conditions, all contributing to larger and more catastrophic wildfires.[29] The potential for severe fire can be reduced by active land management, with the objective of maintaining forest cover and structure within a range consistent with long-term disturbance processes.[30] Many scientists believe cutting and removing trees—i.e., thinning and timber harvesting—are necessary parts of forest restoration strategies.[31] Forest Service scientists concluded that "active management appears to have the greatest chance of producing the mix of goods and services that people want from ecosystems, as well as maintaining or enhancing long-term ecological integrity."[32] The consequences of inaction far exceed those of action.[33]

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Disease and inevitable wildfire killed this once beautiful stand of timber in the Tahoe National Forest near Incline Village and Lake Tahoe.

Western forest landscapes and human communities have been ravaged by preventable catastrophic fires.[34] In response to the wildfires of 2000, the National Fire Plan identified reducing hazardous fuel accumulations and restoring the health of forest ecosystems as ways for reducing wildfire risk to communities and the environment, as well as the appropriate emphases for forest policy.[35] The 10-Year Comprehensive Strategy for implementing the plan is a collaborative approach by federal, state, and tribal governments and was developed in consultation with many affected interest groups. Two of the Strategy's four goals are reducing hazardous fuels and restoring fire-adapted ecosystems.[36]

The conventional wisdom in the National Fire Plan seems to be that fuel treatments are expensive. They need not be. Research at western land grant universities has demonstrated that meeting ecological restoration objectives in fire-adapted forests throughout the West can often produce enough revenue from timber by-products to pay for the project activities, and sometimes substantially more.[37]

National forest managers know how to reduce hazardous fuels and restore ecosystems. However, the Forest Service operates within a decision-making framework it says "has kept the agency from effectively addressing rapid declines in forest health. This same framework impedes nearly every other aspect of multiple-use management as well."[38] Chief Dale Bosworth calls the situation "analysis paralysis."[39] Others call it gridlock. Whatever name one chooses, it must be something other than "thoroughly businesslike management." Although the need for national forest reform is widely recognized, there is no agreement on what shape it should take.[40] Policy-makers could initiate reform by giving Forest Service managers the authority to expeditiously under-take projects that would reduce to sustainable levels the accumulation of vegetation on national forest timberlands. National forests are public lands, and some form of public consent is necessary. To obtain consent directly from the people, the Forest Service will likely need additional resources to undertake effective collaborative learning among affected interests.[41]

An alternative is to categorically exclude fuel reduction and ecological restoration projects from environmental analysis under the premise that creating sustainable conditions *per se* has benefits that outweigh costs. On a project by project basis the goals of consent are not only to define sustainable forest conditions but to provide measurable management objectives. If fuel treatment and forest restoration work is done effectively, the level of public trust and confidence in the agency could also be restored.

Conclusions

The condition of western national forest timberlands puts a variety of values at greater risk than need be. Active management can improve the situation.

- National forests, with 19% of the nation's timberlands, have a disproportionately large portion (46%) of the softwood resource from which comes a disproportionately small (6%) amount of the softwood timber harvest.
- More than 40 million acres of western national forests are subject to severe catastrophic fires.
- Fuel accumulation is widely recognized as a serious forest health problem. The current forest density, growth, mortality, and removals situation on western national forests portends continued accumulations of fuel, as inventory has been building since 1987.
- Western national forests are denser than forest in other ownerships: 47% denser in the Pacific Coast region and 63% in the Interior West.
- Western national forests have higher mortality rates than forests in other ownerships: 50% higher in the Pacific Coast region and 80% higher in the Interior West.
- Western national forests have extraordinarily high growth/removal ratios: 6.7 in the Pacific Coast region and 9.0 in the Interior West.
- National forest timber inventories could physically sustain three times the current level of softwood removals, or the timber harvest levels of the 1980s.
- Active management strategies that include cutting trees and removing them from the site can help restore more sustainable conditions on national forest timberlands.
- Treatment costs can be reduced by combining ecological restoration objectives with hazardous fuel reduction objectives.
- The alternative to active management is reduced productivity, many dead trees, and fuel conditions favorable to severe and potentially destructive wildfires.[42]
- Two obstacles to active management are public policy and public trust. The Forest Service cannot effectively treat forest health problems because of the "Process Predicament," or decision gridlock.

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Forest Land &Timberland - 2002
by ownership

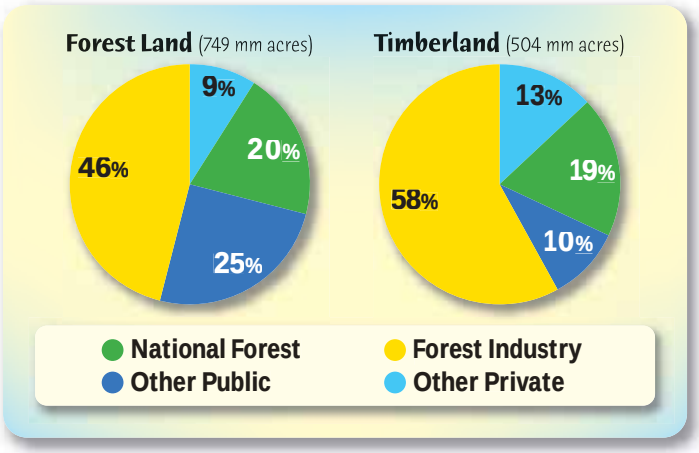


FIGURE 1

Timberland Inventory & Removals - 2001/02
by softwood & hardwood inventories

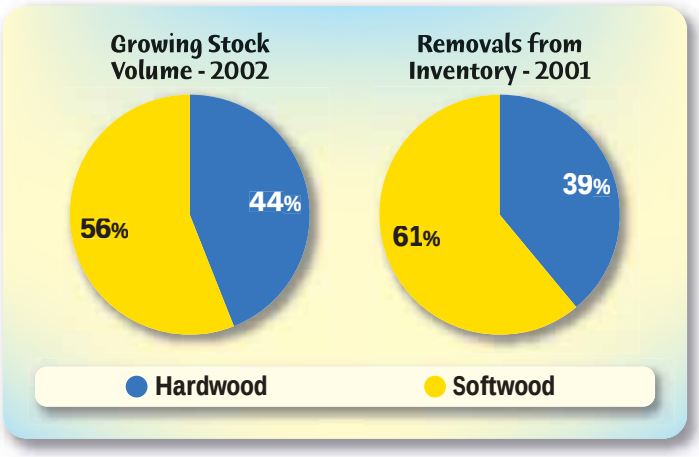


FIGURE 2

Softwood Inventory & Removals - 2001/02
by ownership

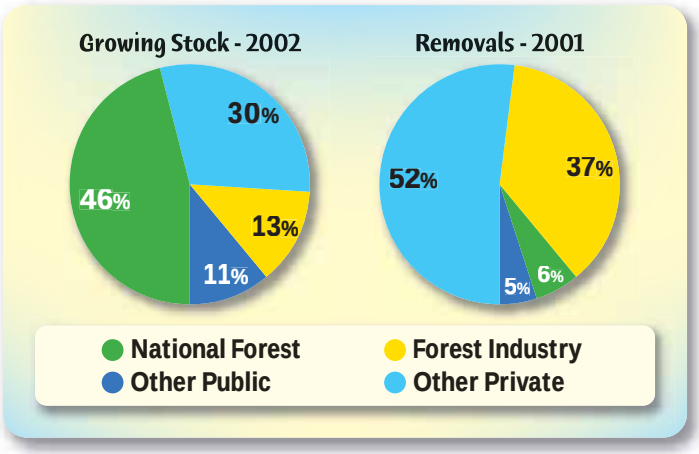


FIGURE 3

Softwood Inventory Volume - 1952 to 2002
by ownership of growing stock - in billions of cubic feet

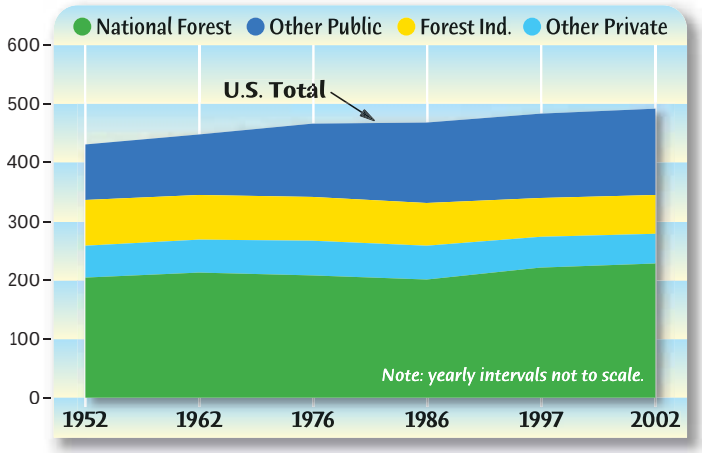


FIGURE 4

Softwood Removals - 1952 to 2001
by ownership - in billions of cubic feet

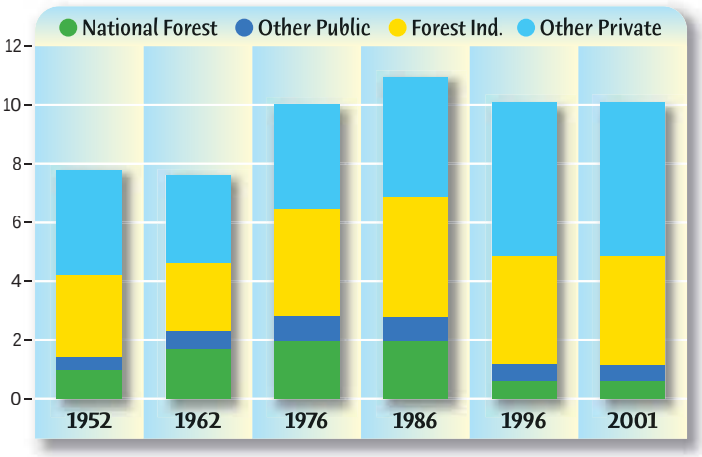


FIGURE 5

National Forest Acreage & Softwood Inventory - 2002
Top 20 States on all Ownerships

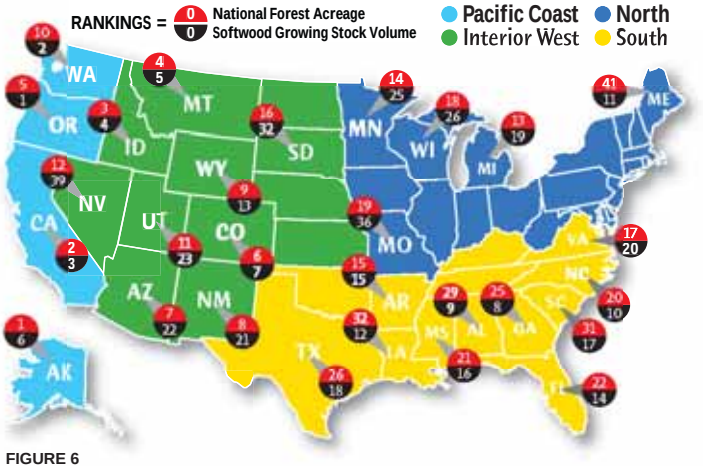


FIGURE 6

Dr. Jay O'Laughlin, Director, Policy Analysis Group, University of Idaho, and Philip S. Cook, PAG Research Associate constructed these charts from information available from various U.S. Forest Service Sources including *Forest Resources of the United States, 1997,* and subsequent updates. Dr. Con Schallau, a forest economist and member of the Evergreen Foundation Board of Directors, constructed the Page 27 "Forecasts for Growth, Harvest and Mortality" for five western national forests using USFS data.

Western National Forests: Softwood Resource

Softwood Inventory & Removals - 2001/02
by region

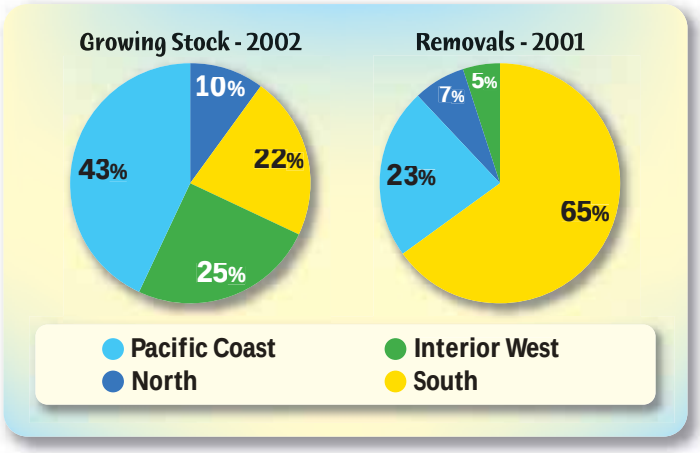


FIGURE 6

Forest Density by Region - 1953 to 2002
hardwood & softwood growing stock per acre - in cubic feet

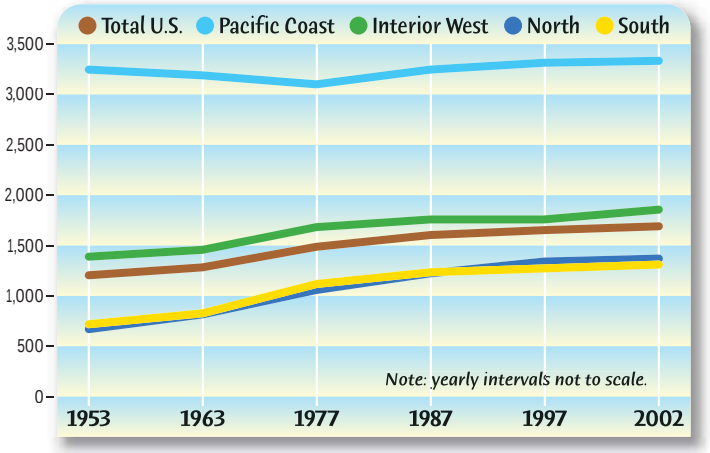


FIGURE 9

Softwood Inventory Volume - 1953 to 2002
by region of growing stock - in billions of cubic feet

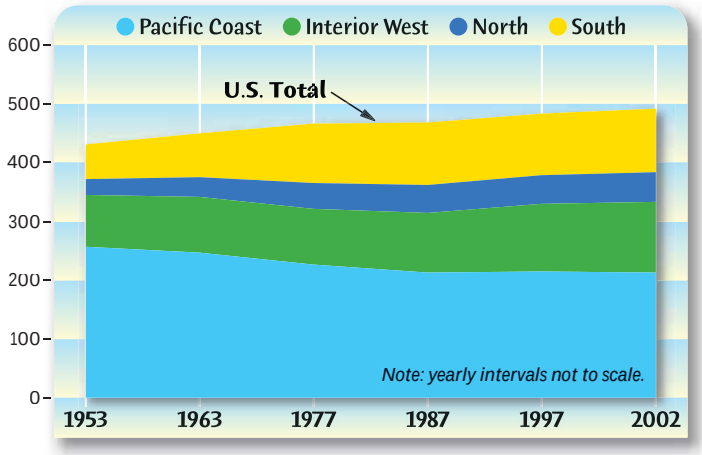


FIGURE 7

Softwood Mortality by Ownership - 1953 to 2002
mortality as a percent of gross annual growth

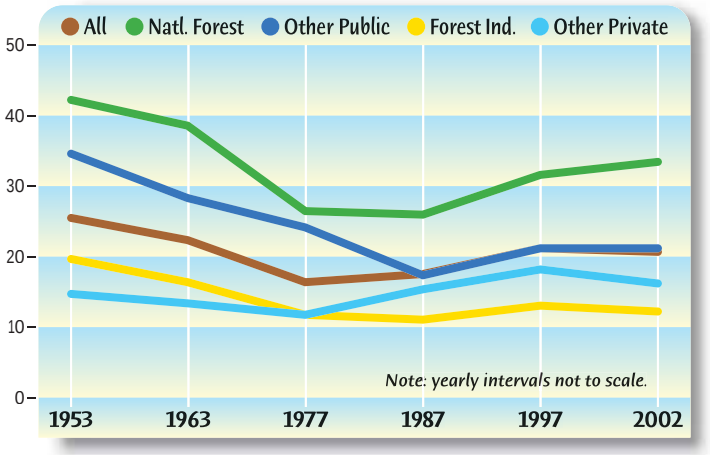


FIGURE 10

Forest Density by Ownership - 1953 to 2002
hardwood & softwood growing stock per acre - in cubic feet

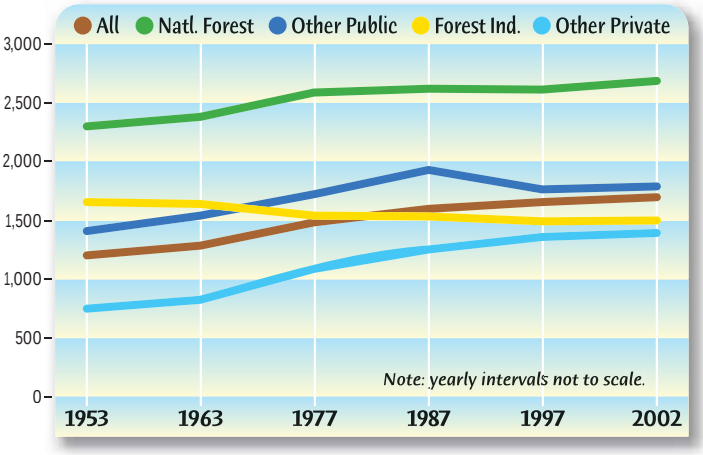


FIGURE 8

Softwood Mortality by Region - 1953 to 2002
mortality as a percent of gross annual growth

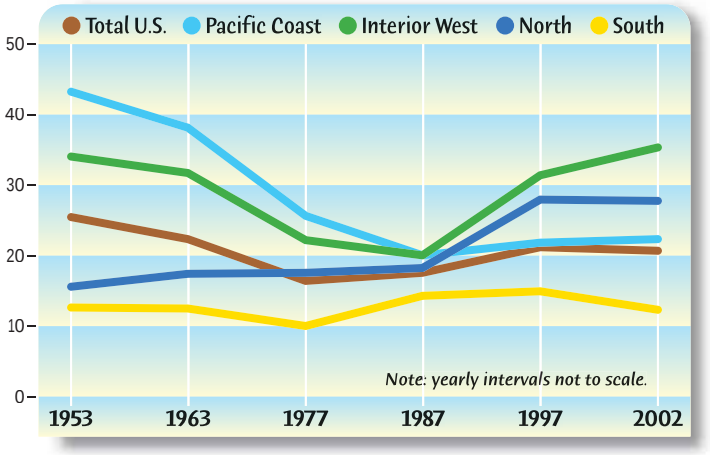


FIGURE 11

ce Conditions and Management Implications

Growth/Removal Ratio by Ownership - 1953 to 2002
softwood net annual growth/annual removals

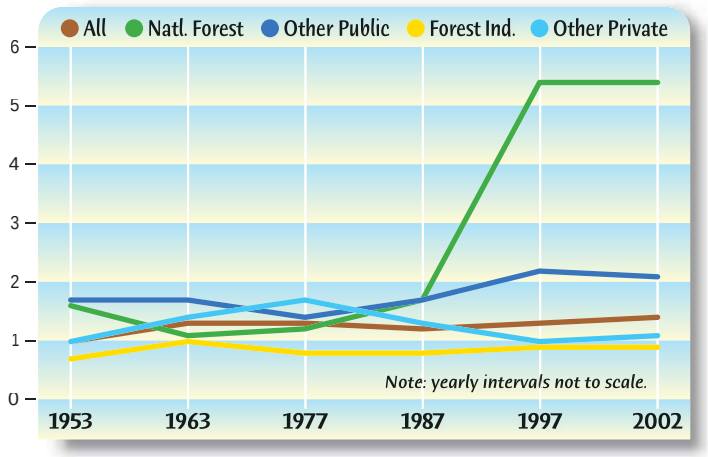


FIGURE 12

Growth/Removal Ratio by Region - 1953 to 2002
softwood net annual growth/annual removals

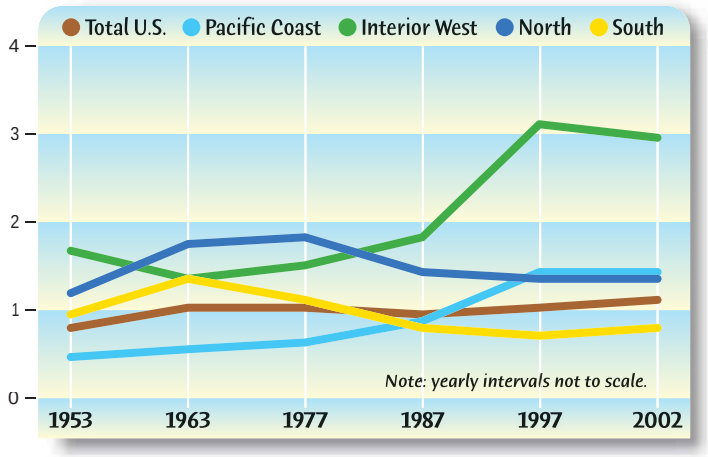


FIGURE 13

N.F. Growth/Removal Ratio by Region - 1953 to 2002
National Forest softwood net annual growth/annual removals

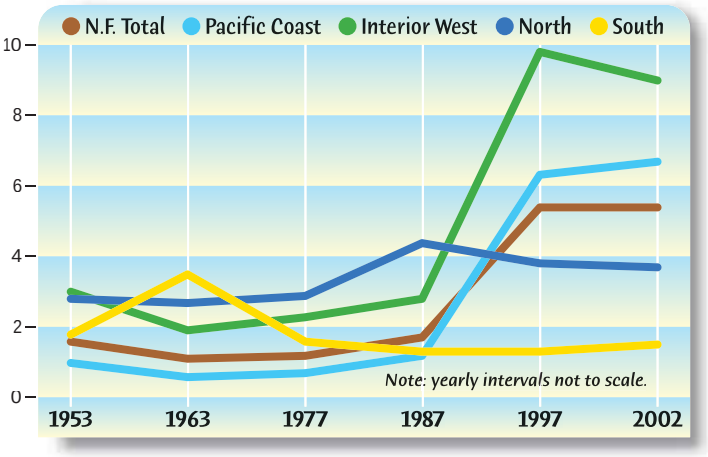


FIGURE 14

Pacific Coast Forest Density by Ownership - 1953 to 2002
hardwood & softwood growing stock per acre - in cubic feet

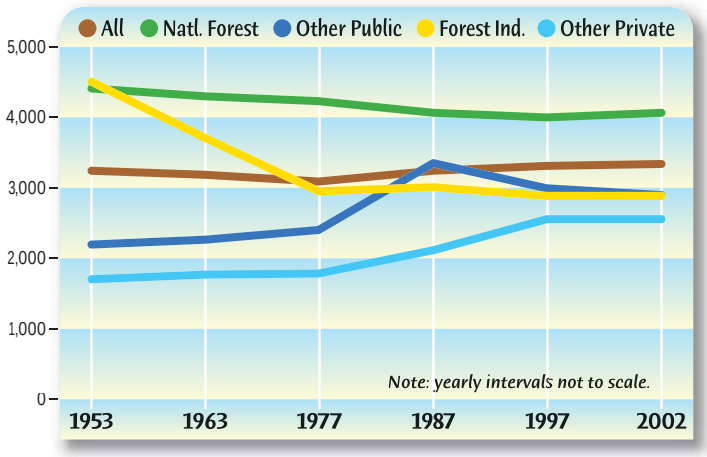


FIGURE 15

Pacific Coast Softwood Inventory - 1953 to 2002
by ownership of growing stock - in billions of cubic feet

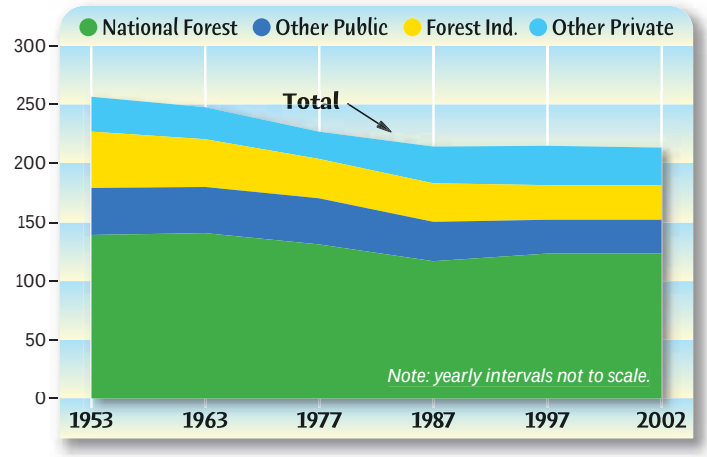


FIGURE 16

Pacific Coast Softwood Removals - 1952 to 2001
by ownership - in billions of cubic feet

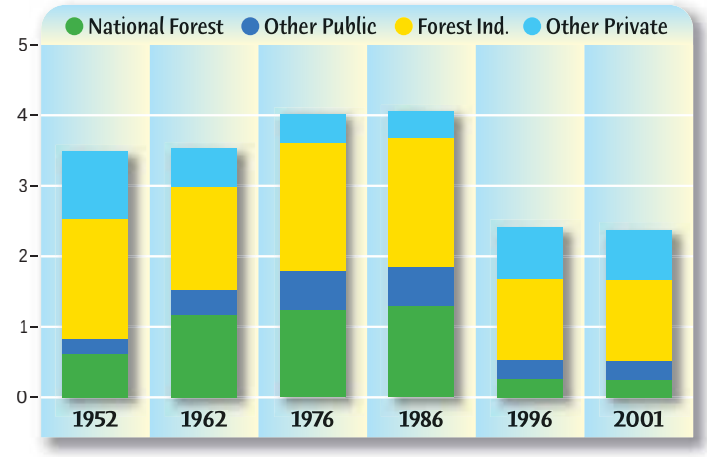


FIGURE 17

Western National Forests: Softwood Resource

Pacific Coast Mortality by Ownership - 1953 to 2002
softwood mortality as a percent of gross annual growth

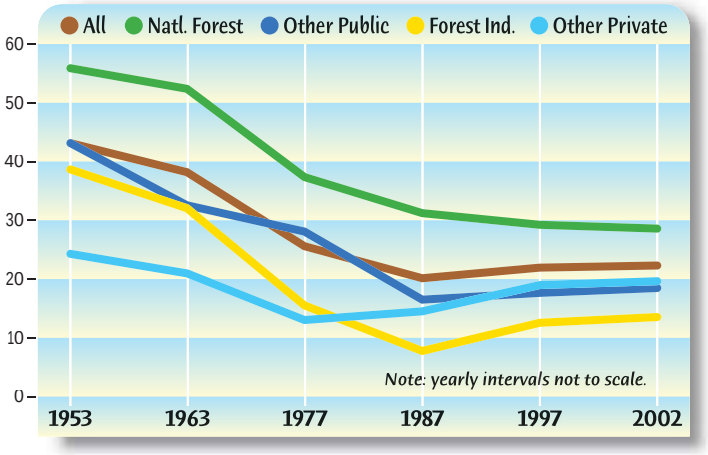


FIGURE 18

Pacific Coast Softwood Inventory - 1953 to 2002
by ownership of growing stock - in billions of cubic feet

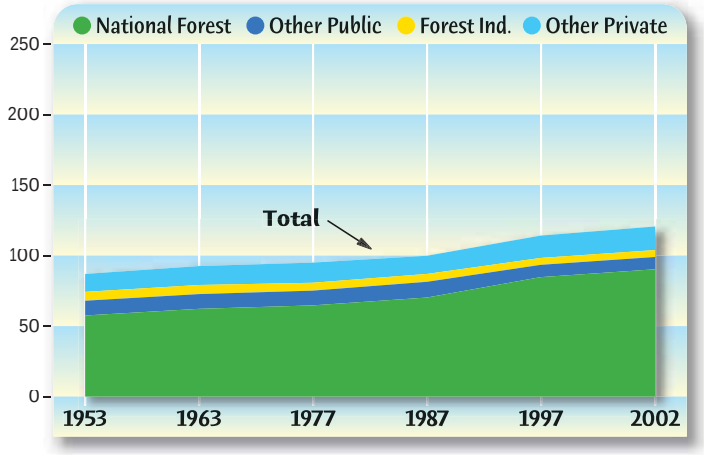


FIGURE 21

Pacific Coast National Forest Comparison - 1953 to 2002
compared to other ownerships combined

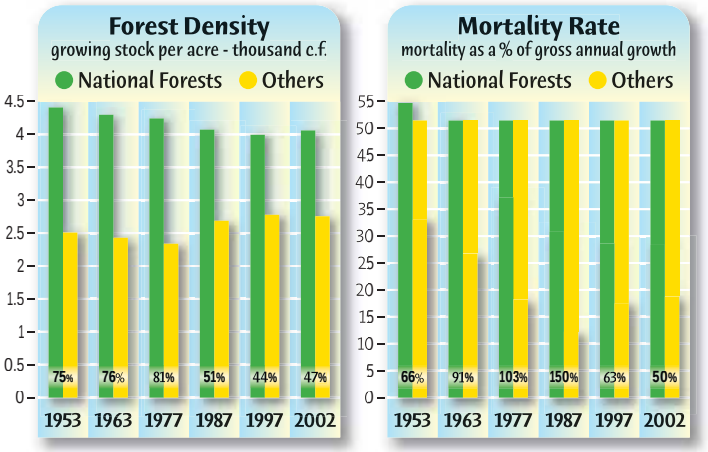


FIGURE 19

Interior West Softwood Removals - 1952 to 2001
by ownership - in billions of cubic feet

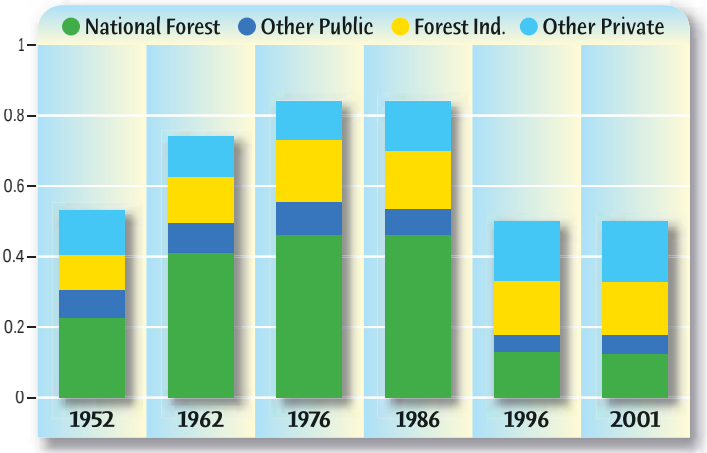


FIGURE 22

Interior West Forest Density by Ownership - 1953 to 2002
hardwood & softwood growing stock per acre - in cubic feet

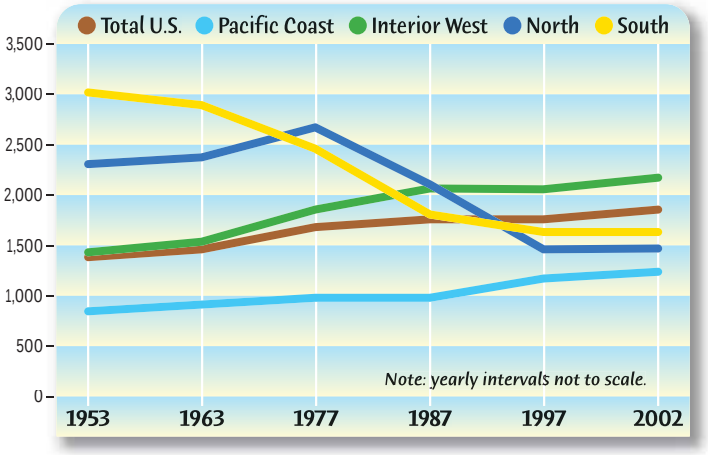


FIGURE 20

Interior West Mortality by Ownership - 1953 to 2002
softwood mortality as a percent of gross annual growth

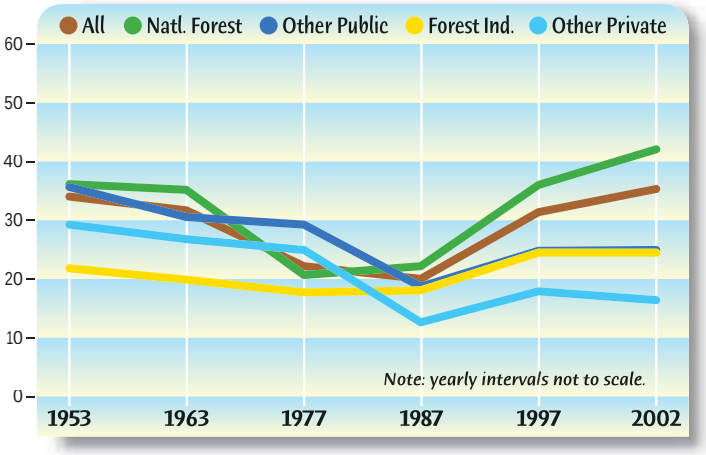


FIGURE 23

ce Conditions and Management Implications

Interior West National Forest Comparison - 1953 to 2002
compared to other ownerships combined

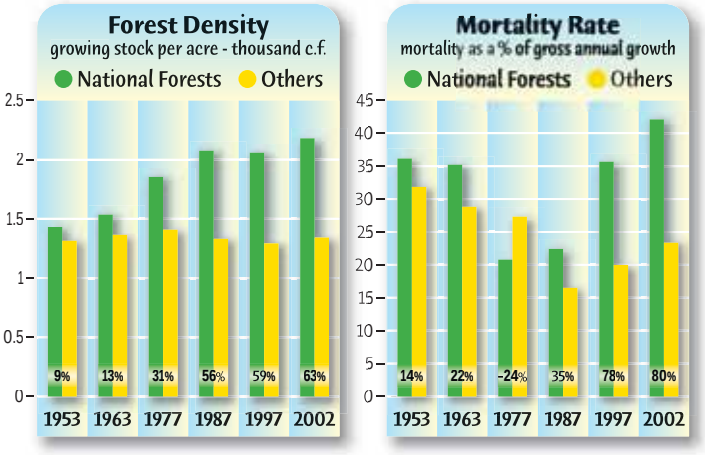


FIGURE 24

Mt. Hood National Forest
Forecast of Harvest, Growth & Mortality

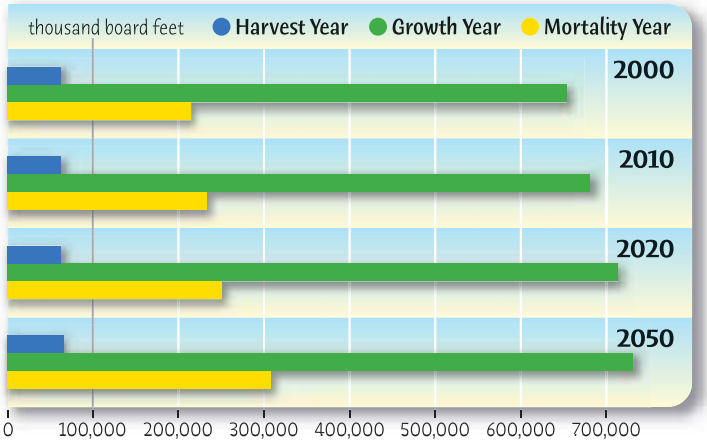


FIGURE 28

Siskiyou National Forest
Forecast of Harvest, Growth & Mortality

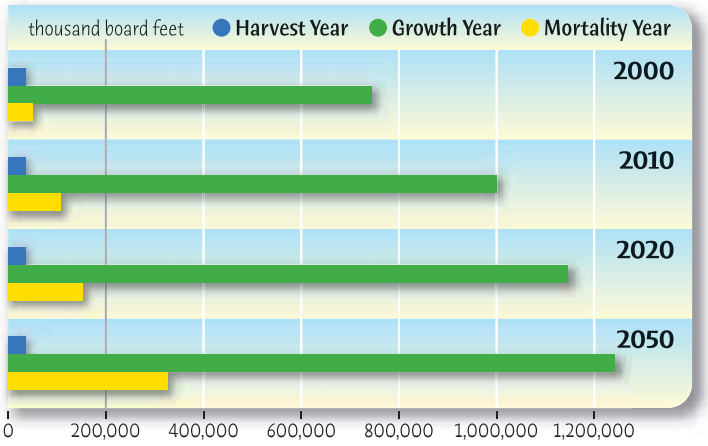


FIGURE 25

Colville National Forest
Forecast of Harvest, Growth & Mortality

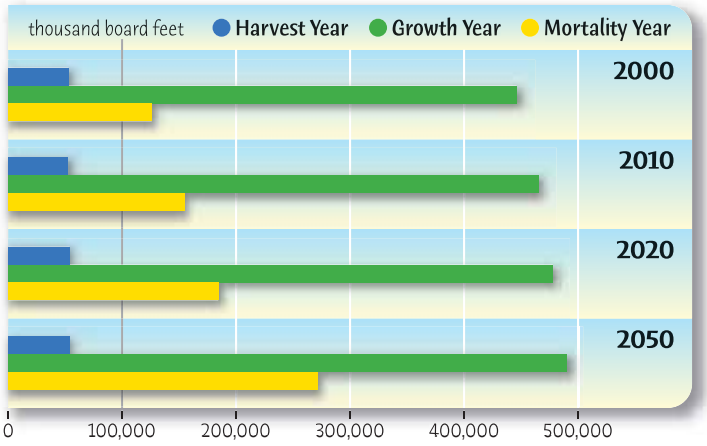


FIGURE 29

Siuslaw National Forest
Forecast of Harvest, Growth & Mortality

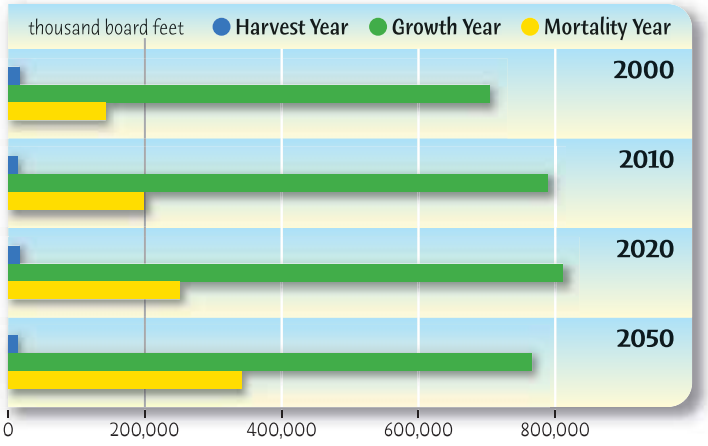


FIGURE 26

Flathead National Forest
Forecast of Harvest, Growth & Mortality

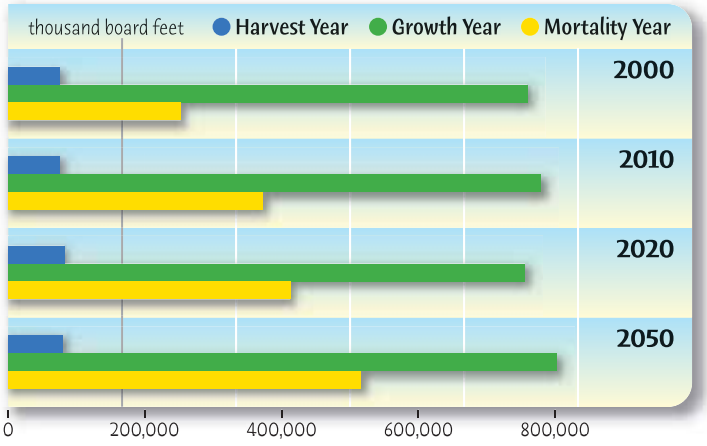
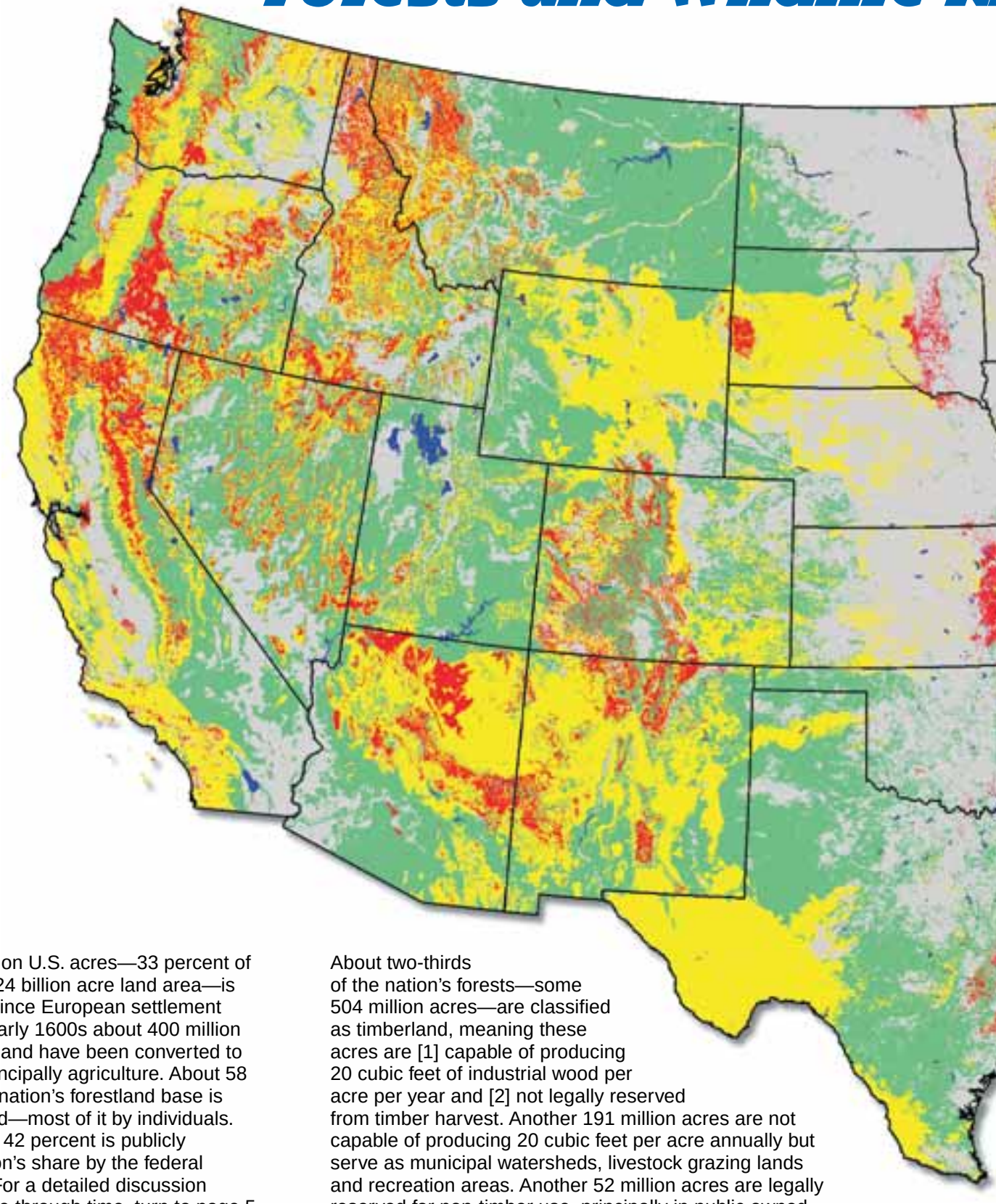


FIGURE 30

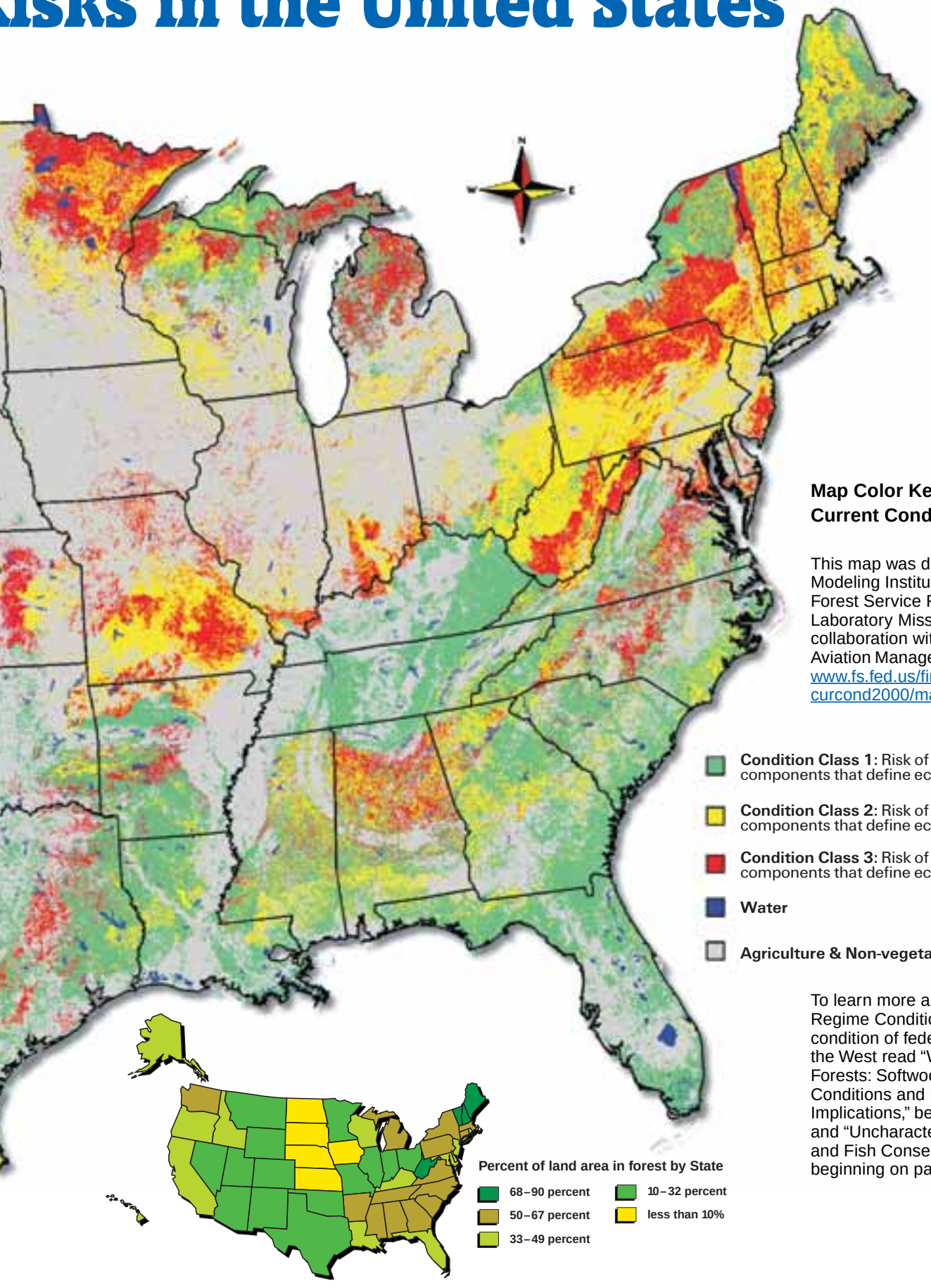
Forests and Wildfire Ri



Some 747 million U.S. acres—33 percent of the nation's 2.24 billion acre land area—is still forested. Since European settlement began in the early 1600s about 400 million acres of forestland have been converted to other uses, principally agriculture. About 58 percent of the nation's forestland base is privately owned—most of it by individuals. The remaining 42 percent is publicly owned—the lion's share by the federal government. [For a detailed discussion of U.S. land use through time, turn to page 5 and read "A Brief History of U.S. Forests," by Doug MacCleery.]

About two-thirds of the nation's forests—some 504 million acres—are classified as timberland, meaning these acres are [1] capable of producing 20 cubic feet of industrial wood per acre per year and [2] not legally reserved from timber harvest. Another 191 million acres are not capable of producing 20 cubic feet per acre annually but serve as municipal watersheds, livestock grazing lands and recreation areas. Another 52 million acres are legally reserved for non-timber use, principally in public owned parks and wilderness areas.
[Source: USFS, Forest Resources of the United States, 1997]

Risks in the United States



Map Color Key: Fire Regime Current Condition Classes

This map was developed by the Fire Modeling Institute and the U.S. Forest Service Fire Sciences Laboratory Missoula, Montana, in collaboration with USFS Fire and Aviation Management. www.fs.fed.us/fire/fuelman/curcond2000/maps/cc2000.pdf

- **Condition Class 1:** Risk of losing one or more components that define ecosystem is low
- **Condition Class 2:** Risk of losing one or more components that define ecosystem is moderate
- **Condition Class 3:** Risk of losing one or more components that define ecosystem is high
- **Water**
- **Agriculture & Non-vegetated Areas**

Percent of land area in forest by State

- 68–90 percent
- 50–67 percent
- 33–49 percent
- 10–32 percent
- less than 10%

At 90 percent, Maine is the most heavily forested state, and at one percent North Dakota is the most sparsely forested state [Source: USFS, Forest Resources of the United States, 1997]

To learn more about the Fire Regime Condition Classes and the condition of federal forest lands in the West read “Western National Forests: Softwood Resource Conditions and Management Implications,” beginning on page 18 and “Uncharacteristic Wildfire Risk and Fish Conservation in Oregon,” beginning on page 41.

"The claim that using wood somehow leads to forest loss is backwards and silly. Every time we use wood—every time we buy a two-by-four at a lumberyard or a ream of paper at an office supply store—we are in fact ordering up new trees for planting in forests."

Patrick Moore, Ph.D. forest ecologist and Greenpeace co-founder, from an *Evergreen* interview at the Boise Basin Experimental Forest near Idaho City, Idaho, September 2002

Think Globally. Act Lo

It may seem like heresy—this Patrick Moore notion that that the world should be consuming more wood, not less—but his latest dissent from conventional environmental wisdom is shared by many eminent forest scientists who see increasing wood use as a big step forward in the quest to reduce global atmospheric carbon dioxide pollution.

We'll have more to say about carbon dioxide emissions in a few moments. But first meet the irrepressible Dr. Moore: Ph.D. forest ecologist, Greenpeace co-founder, legendary boat rocker and fearless promoter of really big ideas. Who would have ever thought to marry citizen unrest over the war in Vietnam to a growing uneasiness about the state of the planet? Well, Patrick did.

With the help of Greenpeace colleagues who shared his vision for a healthier more peaceful planet, he held a mirror up in front of the world. Millions of us peered into it and did not like what we saw. By the mid-eighties mainstream society had embraced many environmental ideas previously considered radical. Canada stopped hunting baby seals, dumping nuclear waste in the North Atlantic was outlawed, whaling in the North Pacific ended too, and moratoriums were declared on hydrogen bomb testing.

Now Patrick has moved on—some would say gone home—to defend his heritage [he is the son and grandson of British Columbia loggers] and his science against what he says are unwarranted attacks by leftists who highjacked the green movement after the Berlin Wall fell, exposing both socialism's failures and capitalism's

Jim Petersen

Patrick Moore

global possibilities. And he is again holding up his mirror in the hope that we will see the error of our ways.

"I left Greenpeace believing we had accomplished what we set out to do," he said in a recent *Evergreen* interview. "We had rung the ecological fire alarm awakening much of the developed world to our global predicament. But while Greenpeace could define problems it did not necessarily have the solutions, nor was it equipped to implement them. That requires the combined efforts of governments, corporations, public institutions and environmental groups. Today I work in all these arenas."

Because Dr. Moore helped found the first global environmental organization the press has for years assumed he quite naturally opposed timber harvesting and forestry itself. He never has. In fact, since leaving Greenpeace in 1986 he has written a fine book, *Pacific Spirit*, penned an update [*Green Spirit: Trees Are The Answer*] and produced a beautiful video, *Trees Are The Answer.* In all three works he uses natural forest renewal to make the case for forestry's contributions to the environment. More recently he has lent his considerable credibility and creativity to the Wood Promotion Network, a forest industry coalition formed two years ago to advance wood's dominant position in North American building material—and to defend the industry against claims that wood consumption destroys forests.

"The claim that using wood somehow leads to forest loss is backwards and silly," Dr. Moore says. "Every time we use wood—every time we buy a two-by-four at a lumberyard or a ream of paper at an office supply store—we are in fact ordering up new trees for planting in forests."

How's that again?

"Forget trees," Patrick explains. "Let's talk about tomatoes. If people didn't buy them, growers would not plant them. Pretty soon there wouldn't be any. On the other hand, if tomatoes sold out in two weeks, growers would plant more next year. It's the same with trees. Eighty-five percent of the timber consumed in the United States grows on private land. Growers are planting more than ever before because wood is very popular. But if for some reason consumers stopped buying wood growers would stop planting trees and

ocally. Use more wood!

start planting what consumers wanted. Millions of acres of forestland would be converted to some other purpose to the considerable detriment of our environment. It is precisely *because* we use so much wood that we have so much forest."

Dr. Moore's commitment to forestry and his efforts to help the forest industry craft a story that will win over an often skeptical public have enraged several of his former colleagues. His name appears in the Greenpeace "Guide to Anti-Environmental Organizations" [so does *Evergreen*] and fellow co-founder, Bob Hunter, calls him the "eco-Judas." But Patrick is nonplused.

"The forest industry has an incredibly positive story to tell," he observes. "It produces our most renewable material resource, maintains habitat for thousands of species, removes carbon from the atmosphere and provides a wide range of consumer products without which life as we know it would be impossible. The Wood Promotion Network provides a counter to steel, plastic and concrete claims of environmental superiority, giving the public a more balanced view of the choices they make. Hopefully it will grow into programs that can effectively counter the 'use less wood' policy of the

Looking southwest over intermixed federal, state, private forests near Bitterroot Lake in northwest Montana

Jim Petersen

major environmental lobbies. Wood is not only good, it is the best."

No wonder the highly touted Wood Promotion Network wanted to team up with Dr. Moore when it launched its "Be Constructive" campaign. "He has been a powerful advocate and a tremendous help," says WPN president Kelly McCloskey, a long-time Canadian friend. "His message is heard and accepted in places where we would not be credible without him."

In a decade where successes have been few and far between, WPN looks to be a victory for a forest products industry that has in recent years had great difficulty finding its public voice. Poor markets get most of the blame for under-funded forestry education programs, but the fact is distrust runs rampant among publicly traded companies and their smaller, privately held brethren. Turf battles between associations competing for membership amid the collapse of the federal timber sale program—a collapse made even more painful by consolidation in the debt laden pulp and paper industry—have only made matters worse. As a result, it has been more than 20 years since U.S. forest products manufacturers last put their shoulders to the same wheel. WPN is that wheel.

"It's wonderful to see our industry working toward a commonly shared goal," says Mr. McCloskey. "Ours is a fragmented industry but the birth of WPN and its early successes make it clear that we can still be very effective communicators when we work together rather than at cross purposes."

What caused the industry to come together again after so many years of acrimony? The dumbfounding revelation that between 1997 and 2000 U.S. lumber manufacturers lost nearly $1 billion in market share to the steel framing and concrete industries. Adding insult to injury, television and print advertisements sponsored by the two industries hyped environmentalist claims that forests were not being sustainably managed. Worse yet, Ninja look-alikes were unfurling banners from Home Depot and Lowes rooftops accusing the nation's two largest lumber retailers of profiting from the destruction of old growth forests.

"It was a real wakeup call," recalls Mr. McCloskey. "Many had assumed the wood industry's dominance of the homebuilder market was unassailable. The discovery that two competing industry had taken nearly $1 billion in just three years got everyone's attention. In less than 12 months we put together a coalition of the largest wood producers in the U.S. and Canada, raised the startup capital we needed and went to work."

The WPN strategy is both straightforward and unique: unique for its up front commitment to coalition building, a hard-to-quantify art form many cost conscious CEO's have resisted for years; and straightforward in its quest to reverse market share losses by restoring builder and consumer confidence in

Green By Design

Jim Petersen

Cougar Crest Lodge near Coeur d'Alene, Idaho

Life cycle assessment software developed by the non-profit ATHENA Sustainable Materials Institute quantifies the environmental footprints left by three 50,000 square foot buildings—one constructed from wood and the others from steel or concrete. As these charts illustrate, wood is by far the most environ-mentally friendly building material. Steel buildings use about 2.4 times as much energy as wood during their life cycle. Greenhouse gas emissions are 1.81 times higher for concrete buildings than they are for same-size wood structures. Wood's air and water pollution and solid waste indices are also more favorable than those for steel or concrete. And when compared to steel or concrete, wood designs also have the lowest ecological resource index. ["Green by Design," Canadian Wood Council, www.cwc.ca, "Environmental Building News," www.buildinggreen.com and LEED (Leadership in Energy and Environmental Design), Green Building Rating System, www.leedbuilding.org]

both wood products and forestry.

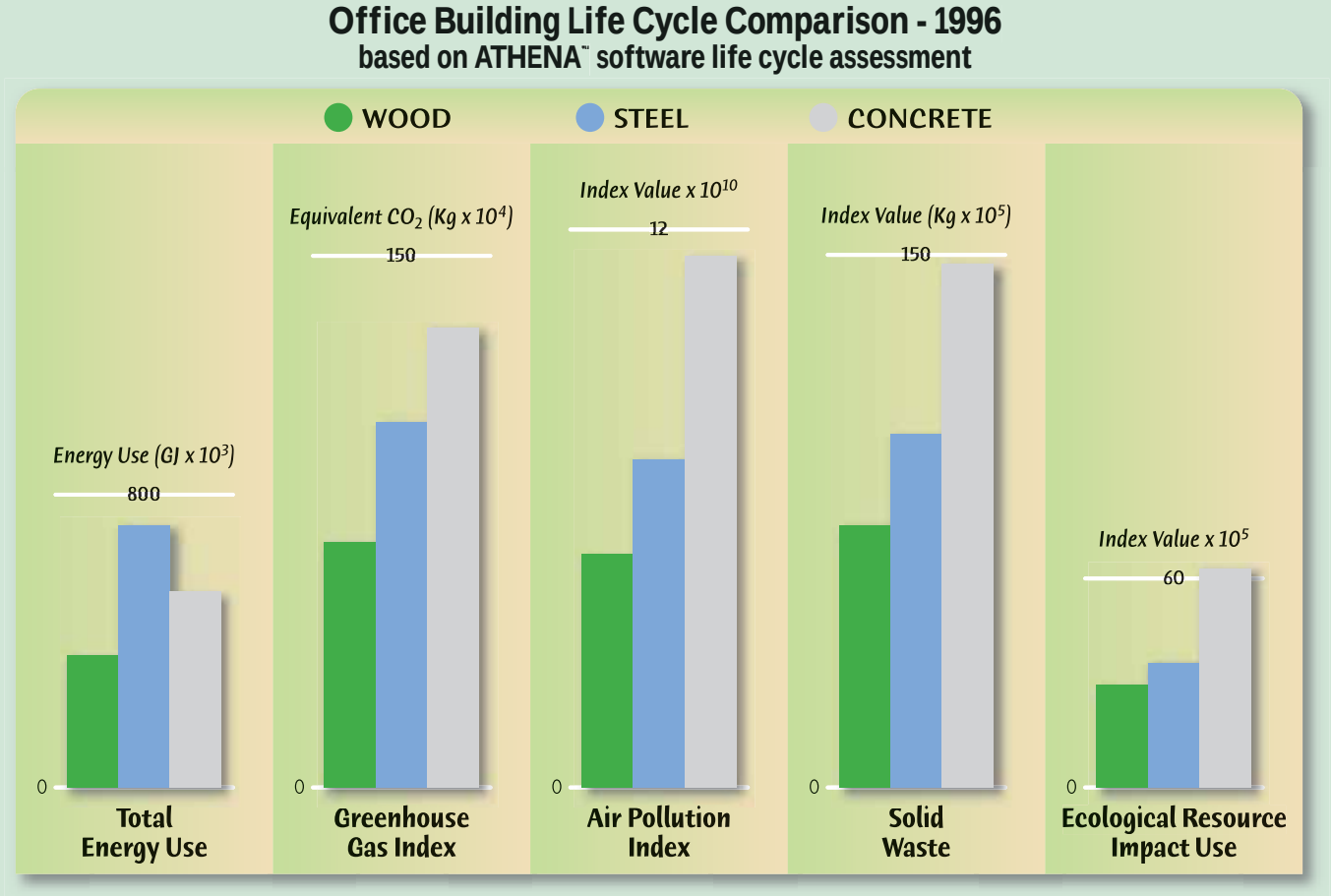
Mr. McCloskey and his coalition partners face a daunting task. Many of the timber industry's most experienced public relations people were let go during the late 1970s recession and never replaced. In fact, in the decade before the American Forest & Paper Association launched its Sustainable Forestry Initiative in 1994 the nation's big timberland owners did little as a group to refute criticism of its forest management practices. From this perspective, WPN's early successes are indeed stunning. In less than two years Mr. McCloskey has signed up an impressive array of partners: 320 companies, more than 120 customer groups and nearly 100 associations across the U.S. and Canada. The fete becomes even more remarkable in light of the fact that most of his members are —first and foremost—fierce competitors with no great love for one another.

"We found common ground in a clearly articulated message that everyone could rally around," Mr. McCloskey explains. "The message is that wood is a superior product and forests are abundant and growing. We are not running out of forests or trees for harvest as some environmentalists allege. Wood producing forests in the U.S. and Canada are well regulated and well managed. The fact is that North American forests have about the same amount of forest cover today as they had 100 years ago."

Apart from WPN's coalition building success—or perhaps because of it—the organization has scored some laudable publicity successes since it unveiled its "Be Constructive" advertising and public relations campaign at the 2001 International Builders Show in Atlanta, Georgia. Most recently Bob Vila, the nation's best-known handyman, spent a day with Patrick Moore touring a working forest in Maine. The tour was filmed for airing in early 2003 on Mr. Vila's syndicated "Home Again" show.

WPN has also teamed with Lou "Mister-Fix-It" Manfredini, builder, author and "Today Show" correspondent to promote wood use. But it may be that the coalition's greatest success to date has come in its relationship with the Ford Motor Company, which got itself into big trouble last year with the nation's resource providers: loggers, farmers, ranchers and commercial fishermen who have been the company's bread and butter customers for generations. At issue, in what became a public relations nightmare for Ford, was the disclosure that the company was contributing about $5 million a year to radical environmental groups. Then came a series of Ford-sponsored anti-wood, anti-forestry advertisements in *National Geographic* and *Family Handyman*. Then came the eruption.

"If there is a single shining example of the power of coalitions the Ford story is it," observes Mr. McCloskey. "We got involved several years after the



first shots were fired, so the company was already well aware of industry concerns with their funding of environmental groups. They just hadn't acted on it in any significant way. The anti-wood advertisement brought WPN to the table and added countless thousands of people and companies to those already bombarding Ford with the same message: stop what you're doing or you will lose our business."

The Ford story is indeed remarkable. Under pressure from the nation's largely rural natural resource customer base, the company revised its corporate grant making guidelines, established a Ford Country Scholars scholarship program that targets juniors and seniors in rural high schools and formed a $1 million business-to-business partnership with WPN to promote wood and Ford to their common customer base: the builder community.

Perhaps most notably, Ford made a three-year $1.5 million funding commitment to Provider Pals™ [see pages 53-54], a cultural exchange program that targets junior high-age students interested in learning more about the nation's resource culture: its loggers, farmers, ranchers, miners and commercial fishermen. The program, designed by Evergreen Foundation board member Bruce Vincent, is already up and running in eight schools across the nation. [Separately, Montana's Ford dealers contributed a new 2001 Ford F-250 pickup to the Evergreen Foundation.]

Of course, WPN could not do what it does were it not for the presence of a significant and growing body of science that is being used to reverse consumer and builder attitudes concerning wood's environmental advantages and structural integrity.

Among the earliest works: the landmark CORRIM Report, a 1976 study [now being updated] that analyzed the amounts of energy required to harvest, transport and convert wood, steel, brick and concrete into finished products.

The study, conducted under the auspices of the National Science Foundation by the Committee on Renewable Resources for Industrial Raw Materials [CORRIM], laid the groundwork for several subsequent studies—the latest a Canadian systems model that provides architects and builders with an objective and reliable method for comparing the environmental effects of steel, wood or concrete building systems. The model, developed by the non-profit ATHENA Sustainable Materials Institute builds on earlier work by Forintek Canada Corporation, a public/private research partnership that compared the environmental footprints of various building materials using a process called "life cycle assessment." LCA, a now internationally recognized assessment tool, tracks energy and material usage, emissions to air and water and waste generated at each stage of a building product's life cycle: extraction, manufacturing, transportation, installation and eventual disposal.

Jim Petersen

Boise Cascade Corporation southern pine plantation near Alexandria, Louisiana. Industrial landowners like Boise own about 13 percent of the U.S. timberland base and provide about 30 percent of the annual harvest.

Although Forintek went to great lengths not to anoint a winner in what to some appeared to be a contest between competing building materials, the model did in fact produce a clear winner in tests comparing the raw material, air, water, and energy impacts associated with the construction of two ten-foot by 100-foot walls: one fabricated from wood studs, the other from steel studs. Canadian economist Jamie Meil, who was then a consultant to FORINTEK, laid out the group's preliminary wall findings in a 1994 issue of *Evergreen* ["Wood and the Environ-ment: Environmental Considerations in Choosing Building Materials].

"Constructing our ten-foot by 100-foot wall from wood requires 25 percent less raw material than is required when the wall is constructed from steel," Mr. Meil wrote. "In terms of embodied energy—energy consumed in the extraction, manufacturing and construction stages—the steel wall requires three times as much energy as the wood wall. And carbon dioxide emissions, which contribute to global warming, are three times as great for the steel wall as they are for the wood assembly." The more sophisticated ATHENA model recorded similar results in recent tests that measured the environmental footprints of 50,000-square foot buildings constructed from steel, concrete and wood. The concrete building required 1.7 times more energy than the wood building, while the steel assembly consumed 2.4 times more energy.

There is, of course, a reason why so much energy is required to make steel and so little is needed to make lumber. Steel, made from iron ore, is forged in blast furnaces heated by fossil fuels that release enormous quantities of carbon dioxide and other air polluting gases as they burn. By contrast, tree growth is driven by the free non-polluting energy of the sun. Better still, as they grow trees absorb carbon dioxide and release oxygen into the atmosphere.

New Zealand botanist Dr. Wink Sutton called it "a miracle process" in a recent *Evergreen* interview. [see pages 48–49] "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 with a very high strength to weight ratio 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."

Wood's versatility—and worries about global consumption—drew more than a thousand scientists and observers to Vancouver, British Columbia in 1992 for a high level conference called to consider options for meeting the raw material needs of a planet expected to have eight billion inhabitants by the year 2020.

"In the next century, there will be unprecedented demand for earth's natural resources," predicted conference chairman, Dr. Jim Bowyer, a frequent *Evergreen* contributor [see "What's Your Environmental IQ?" pages 50-52] "The resources will come from somewhere, and no matter where they come from, there will be environmental impacts. This is why we need to replace the kind of single issue environmental thinking occurring in America with a more systematic, global approach based on realistic assumptions."

Since chairing the Vancouver conference, Dr. Bowyer, who now heads the University of Minnesota's Forest Products Management Development Institute, has championed wood independence for the industrialized world with a message quite similar to Patrick Moore's.

"Nations that consume more than they produce are exporting their environmental impacts to other countries that provide what is consumed," he explained in a 1993 *Evergreen* interview. "It is like shipping your garbage to another town that needs the money and is willing to put up with the stench."

At the core of Dr. Bowyer's argument for self-sufficiency is this: the United States annually consumes far more of earth's natural resources than do all of the world's lesser developed countries. We also possess the wealth and technological know-how needed to minimize the environmental impacts associated with raw material extraction.

Yet we insist on limiting resource development on U.S. soil, importing more and more of what we consume from poor nations with none of the environmental regulations—or pollution abatement and monitoring systems—that exist here. Out of sight out of mind.

"U.S. consumption of wood fiber is by weight roughly equal to the by weight consumption of all metals, plastics and cements combined," Dr. Bowyer says. "Replacing this volume of wood with non-renewable substitutes would unleash unintended global environmental impacts on a scale not seen before. Given this, why would anyone concerned about energy consumption, fossil fuel emissions, or global warming want consumers and builders to switch from renewable wood to non-renewable substitutes? We need to start thinking globally and acting locally, just as environmentalists wisely suggested decades ago. We should be using more wood, not less, and we need to add to our scientific understanding of what constitutes sustainable forestry."

Jim Petersen

Tom Wynne's Douglas-fir Tree Farm west of Olympia, Washington. Private landowners like Mr. Wynne own about 58 percent of the U.S. timberland base and provide about 60 percent of the annual harvest.

For Patrick Moore, Kelly McCloskey and WPN's growing list of partners, the task ahead involves stringing together as many coalition partners as possible, building on public/private funding alliances that have been at the forefront in wood technology research for more than 50 years. Though WPN has produced some impressive television commercials, airtime is expensive. So a series of less expensive print advertisements has been introduced, but even these have not appeared as often as Mr. McCloskey had hoped they would. But down in the trenches where the real work gets done—at home shows, builder expositions and symposiums where scientists and other big picture thinkers gather—the "wood is good" message is resonating. And there is clear evidence the public is tired of environmentalism's Armageddon's drumbeat and is searching for more hopeful real world solutions to earth's environmental problems.

"Forging new coalitions—public and private-sector alliances that work from a common understanding of the role sustainable forestry and wood use play in our lives and in the environment—is where the action is now," Dr. Moore observes. "The work is rewarding, though I have to tell you I think our industry needs to wise up and put some serious money behind this program. Home Depot isn't going to do it for us. We aren't doing anything to convince the average person on the street that loggers aren't villains. Where's Steven Spielberg when we need him? Where is the rap music and where are the out-of-this-world special effects? Ours is a fabulous good news environmental story but until the MTV generation is convinced wood is good the next cycle of voters will always vote against us."

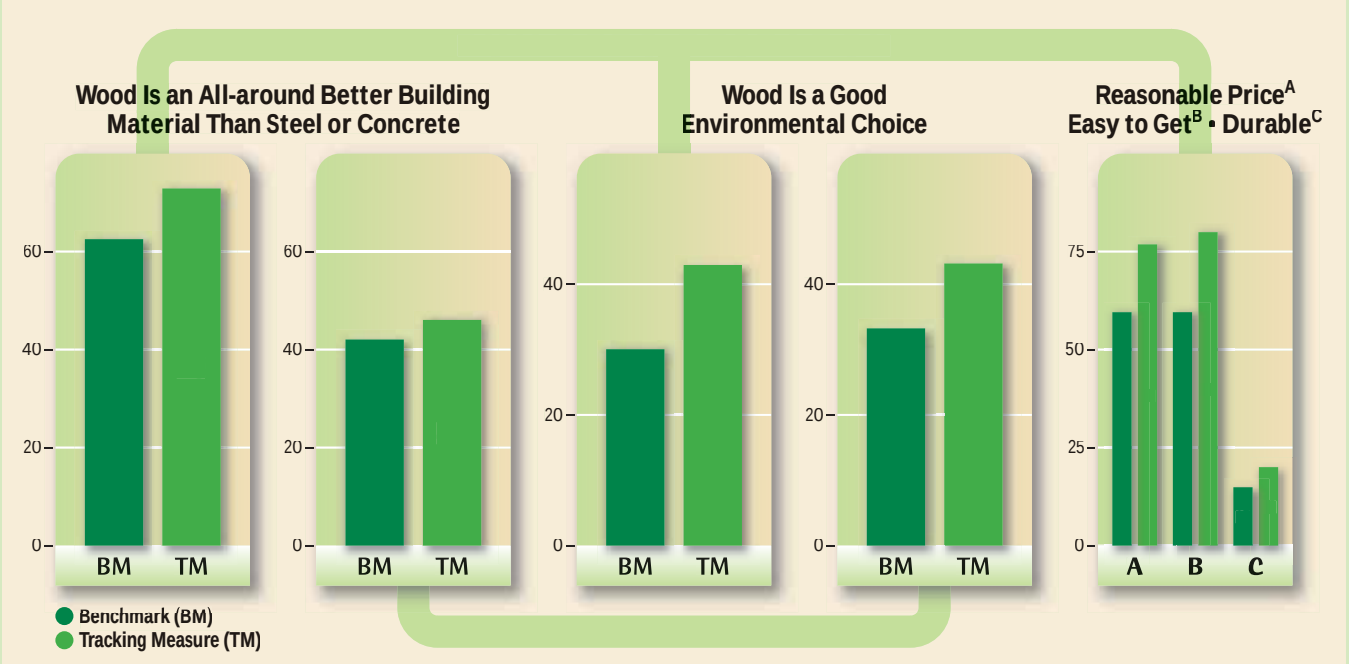
Editor's note: to learn more about Wood Promotion Network log on to their website at *www.beconstructive.com* or www.forestinformation.com. For "Green By Design" information log on to www.cwc.ca/sitemap.php and go to their environmental section; for Patrick Moore, *www.greenspirit.com* and *www.treesaretheanswer.com*; for the Evergreen Foundation, *www.evergreenmagazine.com*; for Provider Pals, www.providerpals.com.

Jim Petersen

This home under construction in Bigfork, Montana features a wide variety of engineered wood products: floor joists, rafters and roof, flooring and wall panels. Engineered wood is rapidly replacing traditional dimension lumber in many building applications because of its higher performance standards, structural superiority and ease of assembly. There are four families of engineered wood: structural wood panels including oriented strand board, structural composite panels and plywood; glued laminated timbers, often called glulam; structural composite lumber, including laminated veneer lumber, parallel strand lumber and oriented strand lumber; and prefabricated wood I-joists or I-beams.

Lou Manfredini: Singing Wood's Praises

WPN's early success can be found in survey data tracking "before and after" answers to a series of statements concerning forest abundance and wood as a building material. Reflecting on the campaign, "Today Show" correspondent Lou Manfredini said, "As a contractor and correspondent, I have been singing wood's praises for many years. With creation of the Wood Promotion Network and the "Be Constructive" campaign, I am finally able to provide my viewers and customers with hard facts about the benefits of the wood that frames their homes."



WOOD.
THE ONLY BUILDING MATERIAL THAT REALLY DOES GROW ON TREES.

NORTH AMERICA'S TREES ARE ABUNDANT AND OUR FORESTS ARE GROWING. Thanks in large measure to steady regeneration, North American forests have grown 20 percent since 1970 and are about the same size as they were 100 years ago. And, sustainable forests producing abundant supplies of affordable, renewable wood help to insure that your business continues to thrive well into the future. To find out more about what makes wood the world's favorite and most environmentally sound building material, visit our websites at www.beconstructive.com and www.forestinformation.com.

WHO ARE WE? We're the Wood Promotion Network: Supporting professionals across North America who build with wood, nature's reliable and renewable construction material. We also promote the responsible management of our growing and abundant forests, so the materials you construct with today will let you be constructive for years to come. To learn more about the Wood Promotion Network call (866) ASK-WOOD or visit our websites: www.beconstructive.com and www.forestinformation.com.

WOOD™
PROMOTION NETWORK
BE CONSTRUCTIVE

This is one of six product reassurance advertisements with environmental themes the Wood Promotion Network developed for magazines and television. Two more campaigns ["Wood Has Life" and "Wood Wise"] encourage designers, builders and consumers to specify or use wood.

A Graphic Perspective on the

Roundwood Production - 1952 to 1996
all products by species - in billions of cubic feet

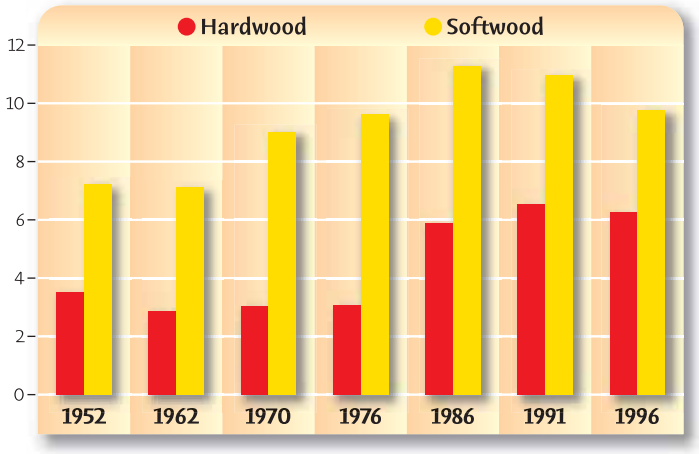


FIGURE 1

Roundwood Production by Source - 1996

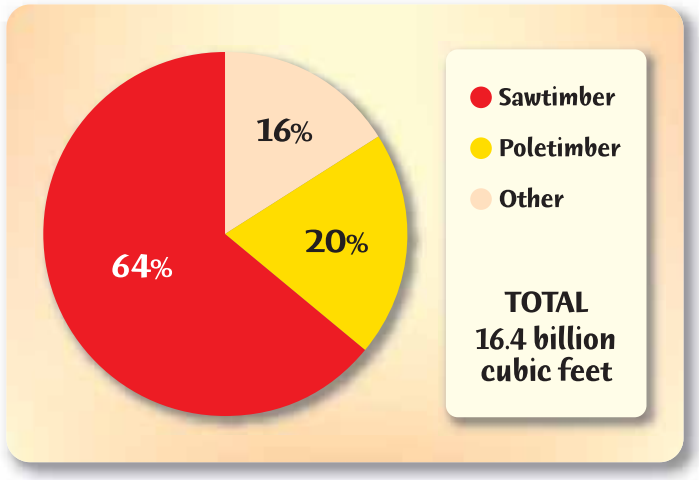


FIGURE 2

Roundwood Production by Product Type - 1996

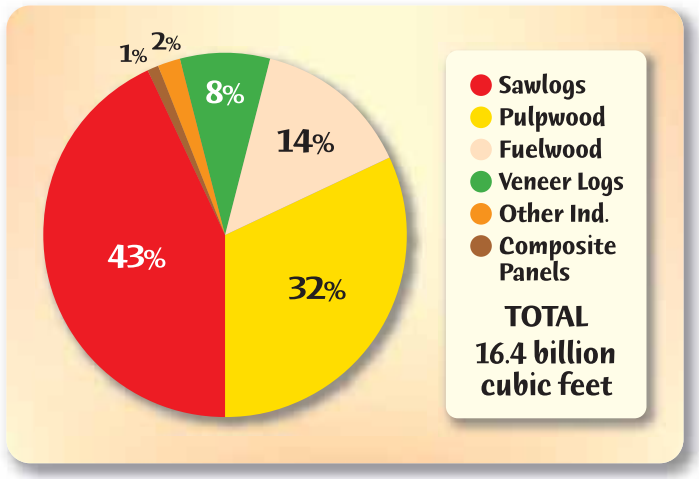


FIGURE 3

Roundwood Production by Ownership - 1996

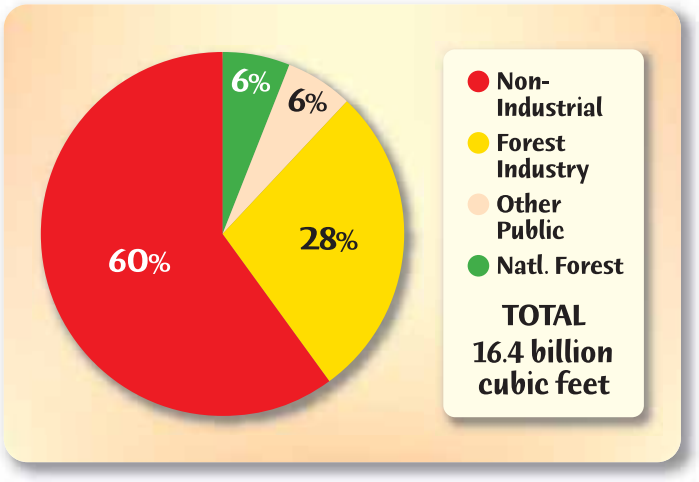


FIGURE 4

Roundwood Production - 1996
all products by state & species - in millions of cubic feet

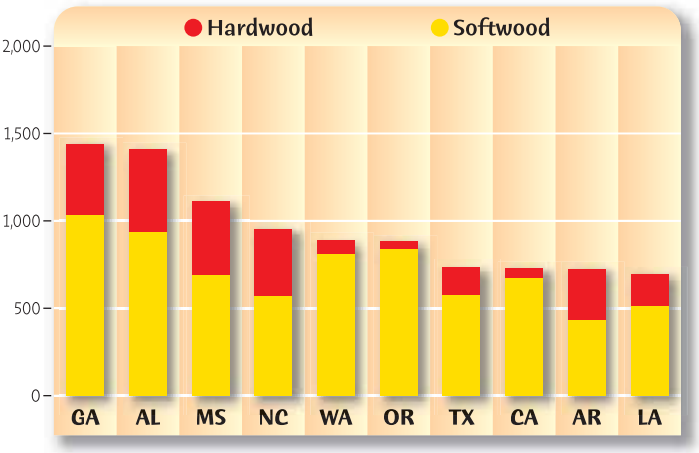


FIGURE 5

Paper & Allied Products - 1997
annual production - in millions of tons

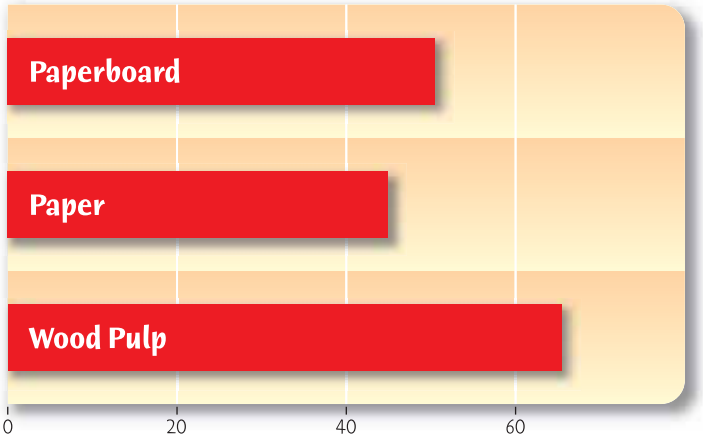


FIGURE 6

U.S. Forest Products Industry

Lumber & Wood Products - 1997
annual production - in billions of board feet

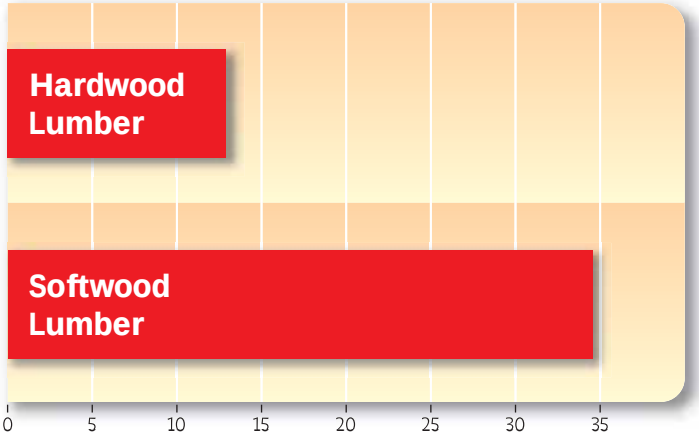


FIGURE 7

Value of Shipments for Top 8 States - 1998
in billions of dollars

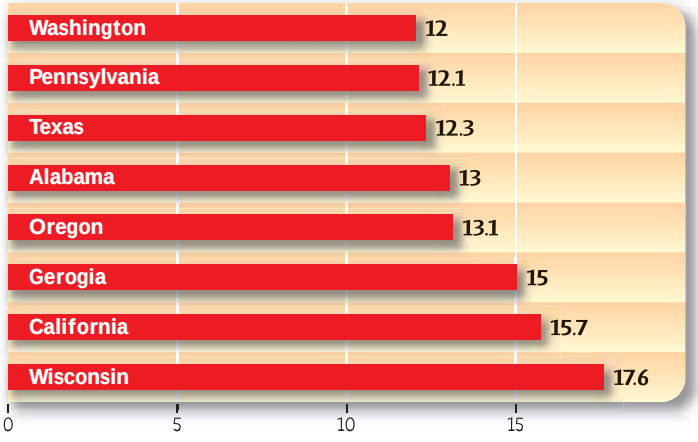


FIGURE 8

Employment & Earnings in the Forest Products Industry - 1998

SECTOR	*EMPLOYMENT*	*EARNINGS - thousand dollars*	*AVG. ANNUAL EARNINGS - per job*
Forestry	62,799	$620, 879	$9,887
Paper & Allied Products	681,200	$28,736, 377	$42,185
Lumber & Wood Products	940,100	$21,741,000	$23,125 25,738

FIGURE 9

Imports & Exports of Forest Products - 1999 & 2000

PRODUCT - in thousands of dollars	*IMPORTS* 1999	2000	*EXPORTS* 1999	2000	*TRADE BALANCE* 1999	2000
Recovered Paper	60,379	91,150	822,048	1,183,000	761,669	1,091,850
Total Paper & Paperboard	10,331,274	11,626,812	6,114,458	6,833,007	-4,216,816	-4,793,805
Converted Paper & Paperboard	2,721,591	3,144,648	3,639,690	3,922,931	918,099	778,283
Other	87,648	80,026	25,738	41,953	-61,910	-38,073
Paper Total	**13,200,892**	**14,942,636**	**10,601,934**	**11,980,891**	**-2,598,958**	**-2,961,745**
Total Soft & Hardwood Prod.	**16,130,926**	**15,546,435**	**6,031,139**	**6,224,600**	**-10,099,787**	**-9,321,835**

FIGURE 10

Selected Forest Industry Economic Stats. - 1997

Value of Paper & Allied Product Shipments	$159.7	billion
Value of Lumber & Wood Products	$102.5	billion
All Forest Product Shipments	$262.3	billion
Employment	1,281,800	
Average Wage (Production Workers)		
Pulp & Paper	$16.17	per hr.
Lumber & Wood Products	$11.43	per hr.
Capital Expenditures	$12.7	billion
R&D Expenditures	$1.8	billion
Pollution Abatement Expenditures (1994)		
Capital	$771.3	million
Operating	$2.2	billion

FIGURE 11

Energy Use in the Forest Products Industry - 1994
by sector - in trillions of BTUs

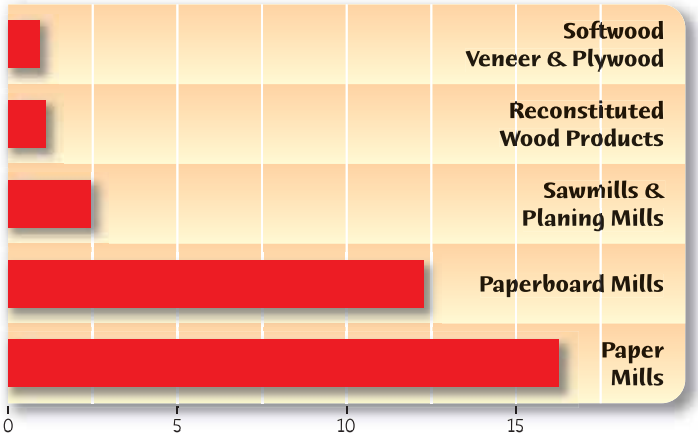


FIGURE 12

What's Your Environmental I.Q.

For the answers to these questions go to our website www.evergreenmagazine.com, click on"Magazine Issues," scroll to the bottom of the page and click on"What's Your Environmental IQ?"

1. The population of the world is currently about:

a. 3.4 billion b. 6.2 billion
c. 8.7 billion d. 9.1 billion
e. 11.5 billion

2. The population of the world is currently increasing at a rate of about 9,043 people per _____.

a. month b. week
c. day d. hour
e. minute f. second

3. The estimated world population in the year 2050 is about:

a. 3.4 billion b. 6.2 billion
c. 8.7 billion d. 9.1 billion
e. 11.5 billion

4. True (T) or False (F). United States population growth is near zero, with the population expected to stabilize by about 2025.

5. Over the past decade, the United States population has grown at an annual rate of about 1%. Some have suggested that this growth rate is too high, and a problem if maintained over the long term, while others note that 1% is a small number and nothing to be concerned about. The *annual* long-term growth rate that you view as acceptable for the United States is _____.

a. 10% or less b. 5% or less
c. 3% or less d. 2% or less
e. 1% or less f. 0.5 % or less
g. 0%

6. True (T) or False (F). The United States is a net exporter of most raw materials used by industry today.

7. True (T) or False (F). The raw material that is used in the greatest quantity in the United States today, and which accounts for almost one-third (by weight) of the total raw materials used annually, is steel.

8. True (T) or False (F). The world is rapidly running out of many important minerals.

9. The number one cause of tropical deforestation worldwide is:

a. commercial logging.
b. wildfire.
c. clearing of lands for agricultural use.
d. gathering of firewood.
e. building of roads and cities.

10. The area covered by forests in the U.S. today is approximately ____of the forested area that existed in 1600.

a. 70 percent b. 50 percent
c. 33 percent d. 25 percent
e. 17 percent

11. True (T) or False (F). The geographic area that encompasses the United States today has a greater extent of forest coverage than the same geographic area did in 1920.

12. Which of the following statements most accurately describes United States forests over the past several decades:

a. forest harvest exceeds net growth by 8 percent.
b. forest harvest has exceeds net growth by 3 percent.
c. forest harvest roughly equals net growth.
d. net forest growth exceeds harvest by 19 percent.
e. net forest growth exceeds harvest by 48 percent.

13. True (T) or False (F). As originally established, it was never intended that the National Forests of the United States would be periodically harvested to obtain timber that would be used in meeting the nation's need for wood.

14. True (T) or False (F). At current rates of deforestation, 40 percent of current forests in the United States will be lost by the middle of the next century.

15. True (T) or False (F). In the U.S. and globally, more species of plants and animals have been driven to extinction by logging activity than any other activity of mankind.

16. True (T) or False (F). Under current United States law, forest harvesting is allowed within federally designated wilderness areas.

17. True (T) or False (F). Populations of elk, pronghorn antelope, and wild turkey have declined significantly in the United States over the past 60 years.

18. True (T) or False (F). Considering the total annual harvest of forests in the United States and the total consumption of wood and wood fiber products within our country, the U.S. is a net importer of wood and wood products.

19. The use of forest products in the United States:

a. has declined significantly since 1960.
b. has remained at about the same level for the past 50 years.
c. is growing slowly as the population increases.
d. has increased on a per capita basis by over 25 percent since 1970.

20. As a percentage of all the paper used in the United States in 2001, ____ was recovered for reuse.

a. 2.9 percent b. 6.5 percent
c. 14.7 percent d. 29.3 percent
e. 48.3 percent f. 60.1 percent

21. Recovered paper provided ____ of the U.S. paper industry's fiber in 2001.

a. 2.0 percent b. 6.1 percent
c. 12.9 percent d. 19.8 percent
e. 24.3 percent f. 38.4 percent

22. True (T) or False (F). More extensive recycling of paper could reduce harvesting of forests in the U.S. by 60 percent or more.

23. The building material that can be produced with the least impact on the environment is:

a. brick b. concrete
c. aluminum d. virgin steel
e. recycled steel f. wood
g. plastic

Uncharacteristic Wildfire Risk and Fish Conservation in Oregon

Stephen P. Mealey and Jack Ward Thomas

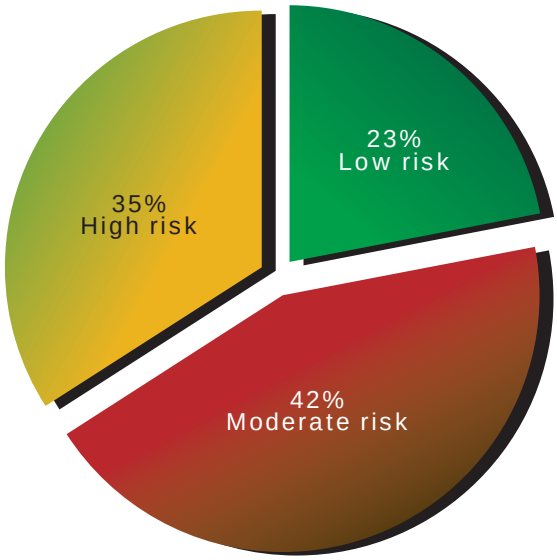
Foward by Jim Petersen

"Uncharacteristic Wildfire Risk and Fish Conservation in Oregon" is one of the most important peer reviewed papers we've ever read. Its co-authors are Steve Mealey, a Forest Service veteran and now Boise Cascade Corporation Manager of Wildlife, Watersheds and Aquatic Ecology and Dr. Jack Ward Thomas, chief emeritus of the Forest Service and now Boone & Crockett Professor of Wildlife Conservation in the School of Forestry at the University of Montana.

Normally we translate such weighty papers into less scientific terms, but we decided to reprint this work verbatim because it makes such a compelling case for assessing the effects of management *inaction* in areas where the risk of uncharacteristic (unusually destructive) wildfire is considered significant.

Wild fish habitat in Oregon is the focal point of this paper, but the regulatory quagmire it exposes now threatens most of the West's forests, including privately owned plantations adjacent to neglected federal forests. Last summer in southern Oregon private landowners lost 12,000 acres in the 27,000-acre Timbered Rock Fire, a lightning caused blaze that began on federal land. Counting reforestation costs, private losses were nearly $10 million. Taxpayers spent another $12 million fighting the blaze.

Uncharacteristic wildfires now pose a high or moderate risk on about 24.7 million acres (77 percent) of Oregon's 32 million acre forestland base. Eighty-six percent of all national forest acres in the state (13.7 of 16 million acres) are in Condition Class 2 (moderate risk, 7 million acres) or Condition Class 3 (high risk, 6.7 million acres).



Oregon Forests at Risk

77 percent of Oregon's forests—some 24.7 million acres—are at moderate or high risk of uncharacteristic wildfire. [USFS Fire Sciences Laboratory, Missoula, Montana]

Although most wild fish species listed as threatened or endangered spawn in watersheds in Oregon's at-risk forests, biologists with the U.S. Fish & Wildlife Service and the National Marine Fisheries Service continue to oppose thinning because [in their view] the *presumed* short-term impacts associated with thinning outweigh the long-term impacts of uncharacteristic wildfire. There is no peer-reviewed science supporting *inaction*, but there are also no widely accepted analytical tools that support *action*. Worse, the Endangered Species Act makes no provision for the kind of risk assessment work needed to justify acting *before* wildfire strikes. Defying common sense, state and federal agencies are thus saddled with the expensive and dubious task of picking up the pieces *after* wildfires strike.

Uncharacteristic wildfires are devastating fish and wildlife habitat—to say nothing of other intrinsic qualities the public cherishes. Consider the 500,000-acre ($150 million) Biscuit Fire that burned mostly in Oregon's Siskiyou National Forest last summer. *Excluding* acres inside the Kalmiopsis Wilderness, 67,500 acres of spotted owl critical habitat and 96,700 acres of marbled murrelet critical habitat were burned, 33 percent at high or moderate severity. 159,500 acres held in protected late successional reserves (old growth) also burned, 38 percent at high or moderate severity. But should habitat losses affecting federally protected species be accepted without first assessing the environmental risks associated with management *inaction*? And should private property suffer the same fate?

Risk assessment is a top priority for the Bush Administration vis-à-vis the President's Healthy Forests Initiative.

A conference focusing on assessment tools and their application in decision-making is planned for Portland, Oregon in October. Intuitively, inaction in the face of inevitable wildfire seems senseless.

Uncharacteristic Wildfire Risk...

By Stephen P. Mealey and Jack Ward Thomas

In Oregon's forests, changes in the structures of both fuels and forests have resulted in a change in fire regime from low-severity to high-severity wildfire (see Chapter 8). The primary vegetation types in which these changes have occurred are the drier, lower-elevation types east of the Cascades and in southwestern Oregon. In response to these changes, Colin Hardy of the USDA Forest Service (USFS) and others (Schmidt and others 2002) have developed coarse-scale maps (Figure 9-1) that project fire hazards and related ecosystem risks in terms of condition classes (Table 9-1).

The status and distribution of wild fish in Oregon are summarized in the *1995 Biennial Report on the Status of Wild Fish in Oregon* (ODFW 1995). Thirteen species are listed as threatened or endangered under the Endangered Species Act (Table 9-2). In this chapter we explore the relationship between uncharacteristic wildfire (larger, more severe, more intense, and less frequent than normal) and its associated risks to ecosystem function and wild fish, with special focus on steelhead (*Oncorhynchus mykiss*), Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), and bull trout (*Salvelinus confluentus*), which are listed under the Endangered Species Act as threatened. We also discuss management implications, including an option for improved decisions.

U.S. Forest Service

The July, 1989 Tanner Gulch Fire wiped out the entire spring Chinook run in the upper Grande Ronde River in eastern Oregon's Wallowa-Whitman National Forest. Most of the steelhead smolt production for the year was also lost. This tributary stream was stripped to bedrock.

Fire-Fish Relationships

The condition class map of Oregon (Figure 9-1) shows high and moderate risks to Oregon's forest ecosystems associated with uncharacteristic wildfire. Fire frequencies have departed from historical frequencies by multiple return intervals. This causes moderate or dramatic changes to one or more of the following: fire size, frequency, intensity, severity, and patterns in the landscape, resulting in uncharacteristic fires (Table 9-1).

Commenting on results of the broader assessment that included this information for Oregon, Laverty and Williams (2000) and Laverty and others (2000), writing in the strategy document on which the National Fire Plan (USDA and USDI 2000) is based, stated, "Wildfires occurring in the shorter interval fire-adapted ecosystems where fuels have accumulated over several missed fire cycles, often burn beyond the natural range of variability.

"Consequently, habitats, soils, and watersheds are burned beyond their adaptive limits. The severity of these fires poses threats to species persistence and watershed integrity. The damage from these fires is often long lasting and, within some ecosystems, may be irretrievable." They also stated, "...the extent and severity of fire could eventually push declining [fish] populations beyond recovery, especially in the West."

While this conclusion may not be universally accepted by fisheries experts, we believe most would agree that the likelihood of uncharacteristic wildfire is increasing and negatively affecting depressed, fragmented fish populations, because the larger the fire in size and intensity, the more likely it is that it will have a negative impact on fish and their habitat.

Review and analysis of the status and distribution of wild fish in Oregon have been extensive and detailed. Periodically, the Oregon Department of Fish and Wildlife (ODFW) publishes a statewide assessment of the status and distribution of wild fish (ODFW 1995). McIntosh and others (1994) assessed changes in fish habitat for "eastside ecosystems," including eastern Oregon, for the 50-year period ending in 1992. Evenson and Hall (1998) prepared an assessment of southern Cascades late-successional reserves, or LSRs [large areas designated for management to preserve and produce late-successional forests under the Northwest Forest Plan (USDA and USDI 1994)] that contained a life history and stock status of wild fish in southwestern Oregon. Anadromous fish stocks in Oregon, Washington, Idaho, and California were reviewed by Nehlson and others (1991). Williams and others (1989) published an assessment of endangered, threatened, and special-concern fishes of North America that included discussion of species in Oregon. All of these authors noted significant declines in many fish species, especially anadromous species, and all attributed declines in anadromous fish populations to habitat loss and degradation related to dams, water diversions, timber harvest, livestock grazing, and mining. Overfishing and introduction of non-native fish and/or hatchery fish also were mentioned as reasons for declining populations/stocks. McIntosh and others (1994) noted a general trend toward loss of anadromous fish habitat on managed lands and stable or improving conditions on unmanaged lands. However, none of these assessments and reviewed literature noted past, present, or potential risks to fish and their

Figure 9-1

Oregon Forests At High Or Moderate Fire Risk

About 77% of Oregon's 32 million acres of forestland are at high [35%] or moderate [42%] risk of uncharacteristic wildfire. By definition, the historic range of ecological conditions identified in these forests has been moderately or significantly altered over time. Key ecosystem components could be lost in a wildfire. [USFS Fire Sciences Laboratory, Missoula, Montana, http://www.fs.fed.us/fire/fuelman]

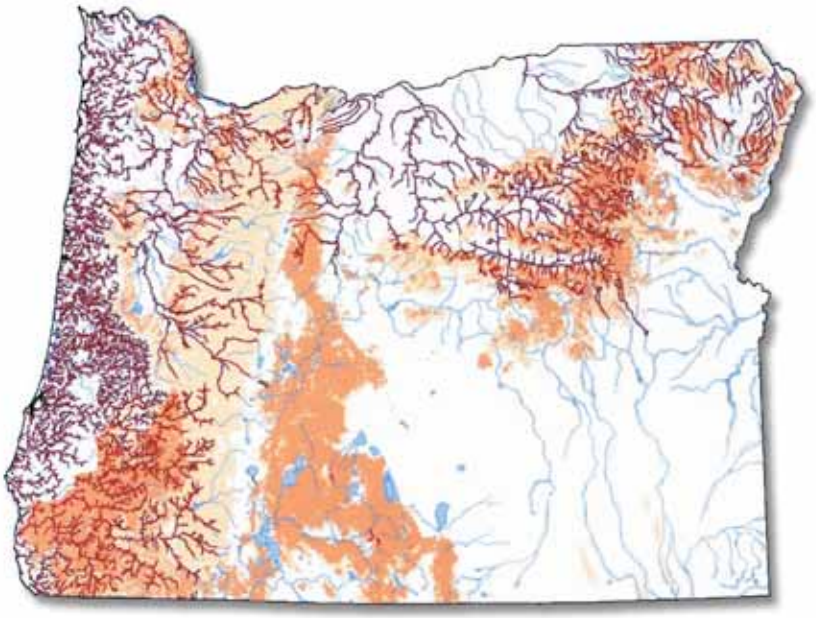


Figure 9-2

High-Moderate Fire Risk and Concurrent Distribution of Steelhead, Chinook salmon and Bull Trout

Oregon forests at high to moderate risk of uncharacteristic wildfire also provide significant spawning and rearing habitat for several protected fish species—salmon, steelhead and bull trout. The question many wildlife and fisheries biologists are asking is, "Should habitat losses affecting federally protected species be accepted without first assessing the environmental risks associated with management?" [USFS Fire Sciences Laboratory, Missoula, Montana, http://www.fs.fed.us/fire/fuelman and Oregon Department of Fish and Wildlife, http://rainbow.dfw.state.or.us/data.html]

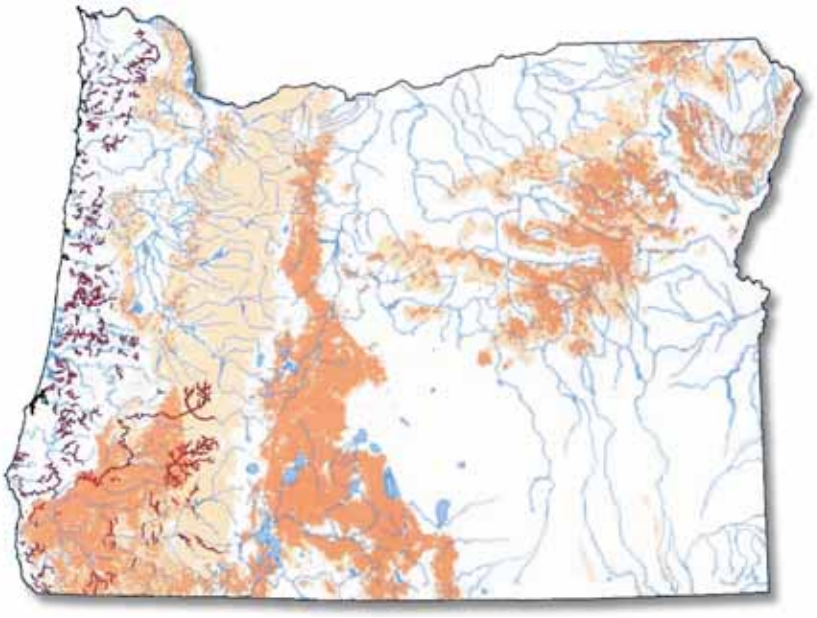


Figure 9-3

High-Moderate Fire Fish & Oregon Plan Core Areas

Oregon Core Plan Areas represent reaches or watersheds within individual coastal basins that are judged to be of critical importance to the sustenance of salmon populations that inhabit those basins. Coho salmon are a prime concern in forested areas of high or moderate wildfire risk in southwest Oregon—scene of last summer's 500,000-acre Biscuit Fire. [USFS Fire Sciences Laboratory, Missoula, Montana, http://www.fs.fed.us/fire/fuelman and Oregon Department of Fish and Wildlife, http://rainbow.dfw.state.or.us/data.html]

habitat from uncharacteristic wildfire.

In southwestern and eastern Oregon, most habitat for anadromous fishes occurs in forests at high risk (Figure 9-2). While less habitat occurs in forests at moderate risk, these forests still present a concern because moderate risk can shift or evolve to high risk as fire frequencies depart from historical levels by multiple return intervals (Table 9-1). Several core areas designated by the Oregon Plan (Kitzhaber 1997) in southwestern Oregon occur in forested areas at high or moderate wildfire risk (Figure 9-3). The Oregon Plan's goal is to restore salmon and steelhead and associated aquatic systems to a productive and sustainable state, providing enhanced environmental, cultural, and economic benefits.

Discussion

Several experts have recently commented on the increase in uncharacteristic wildfire in the western United States and Canada. For example, Tom Quigley, USFS scientist with the Pacific Northwest Station and leader of the Science Assessment Team for the Interior Columbia Basin Ecosystem Management Project (which covered an area of more than 145 million acres mostly in eastern Oregon and Washington, Idaho and western Montana), noted in 1997 that the area affected by "lethal fire regimes" had doubled in recent times. This produced an increasing threat to homes and ecological integrity, including water quality and recovery of anadromous fish species (Quigley and Cole 1997).

Barry T. Hill, Director, Natural Resources and Environment, U.S. General Accounting Office, has sounded several warnings to Congress about the increased risk posed by uncharacteristic fire regimes. He noted in an April 1999 report that experts consulted, including USFS personnel, expressed concern that uncharacteristic fire regimes would prevent achievement of USFS multiple-use mandates because of permanent, long-term damage to watersheds, soils, and fish and wildlife habitat (Hill 1999).

In a 2001 report, he asserted that susceptibility to uncharacteristic fire on 211 million acres (nearly one-third of all federal lands, including those in Oregon) had increased and covered more acres, increasing probabilities of large, intense wildland fires "beyond any scale yet witnessed." That, in turn, was anticipated to dramatically increase risks to watersheds, ecosystems, and associated fish and wildlife species, and human communities (Hill 2001).

These warnings seem well supported. Acute environmental impacts immediately after uncharacteristic wildfires have been documented to cause direct mortality to both anadromous and resident fish (Boehne and Gill 1990, Burton 2000). For example, Boehne and Gill (1990) reported the effects on salmonids from the high-intensity burn in the Tanner Gulch Fire, which occurred on the upper Grande Ronde River watershed of the Wallowa-Whitman National Forest from July 26 to August 8, 1989. That fire event was judged to have killed all of the 1989 adult spring Chinook salmon in the upper Grande Ronde River (41 adults were found dead along 20 miles of river). It was estimated that the event also eliminated much of the steelhead smolt production, with low dissolved oxygen and high turbidity named as main causes of mortality. Ten years after the fire/flood event, this degraded stream reach finally started to recover (Boehne, personal communication, USDA Forest Service 2001).

Burton (2000) reviewed the effects of uncharacteristic wildfires on native fish on the Boise National Forest in Idaho, where over 525,000 acres burned from 1986 to 1994. About 50% of the ponderosa pine (*Pinus ponderosa*) forests burned within areas of historically high frequency/low intensity fire. He found that direct mortality resulted when fire occurred at high intensity adjacent to streams occupied by salmonids. The Foothills Fire of 1992 produced localized fish mortality in Sheep Creek and Rattlesnake Creek and resulted in the elimination of fish from some stream reaches; these were interspersed with short stream segments containing some fish. These streams and others in the burned area were also impacted by landslides and floods, which resulted in losses of large woody debris, a decline in bank stability, increased fine sediment, and reduced pool frequency (see also Chapter 5). Burton (2000) found that while populations can be depressed and locally decimated, habitat and trout populations could rebound significantly, sometimes within as little as five years after the fire or flooding event.

Firefighting helicopter dwarfed by smoke plume in central Washington

Mike McMurray

Jim Petersen

Condition Class 1: Low Risk

The risk of uncharacteristic wildfire is low in Condition Class 1 forests. Prescribed fire and mechanical thinning are good tools for maintaining key ecosystem components. The Boise Basin Experimental Forests near Idaho City, Idaho is one of the West's finest examples of the combined benefits of prescribed fire and periodic thinning.

Jim Petersen

Condition Class 2: Moderate Risk

Condition Class 2 forests show evidence of moderate alteration of historic fire regimes. Fire frequency has increased or decreased from its historic occurrence by more than one return interval, resulting in moderate changes in one or more of the following conditions: fire size, frequency, intensity, severity or landscape pattern. Historic vegetation patterns are also changing. Hand or mechanical treatment may be needed before prescribed fire can be reintroduced. The trail to Hemlock Falls in southwest Oregon's Umpqua National Forest is one such area.

Jim Petersen

Condition Class 3: High Risk

Condition Class 3 forests show evidence of significantly altered historic fire regimes. Fire frequencies have departed from their historic range by multiple return intervals, resulting in dramatic changes in one or more of the following conditions: fire size, frequency, intensity, severity or landscape/vegetation patterns. Key ecosystem components will be lost in inevitable wildfire. This over-stocked and diseased stand in the Fort Valley area west of Flagstaff, Arizona is an excellent Condition Class 3 example.

Permanent downstream barriers to migration, such as logjams, and potential exposure to increased solar radiation resulting in higher water temperatures, were believed to represent the greatest risks to bull trout after uncharacteristic wildfires (Burton 2000).

McMahon and deCalesta (1990), Rieman and others (1997), Gresswell (1999), and Rieman and others (2000) also have discussed the relationships between wildfire and fish. McMahon and deCalesta (1990) found that the longest-lasting and most dramatic negative impacts from fire were associated with the loss of forest cover along streams. The senior author of this chapter has recently observed severely degraded habitat for coho salmon in Flat Creek, a tributary of Elk Creek and the Rogue River and an Oregon Plan Core Area (Figure 9-3). This degradation resulted from the mid-July to early August (2002) Timbered Rock fire, in which many areas, including riparian buffers, burned uncharacteristically in forests with high or moderate wildfire risk. Rieman and others (1997) noted that uncharacteristic wildfires sometimes produced localized extinctions of fish populations, particularly those that were of small size and/or isolated.

Jim Petersen

Jim Petersen

Two very different pictures: Top, riparian zone on a Boise Cascade plantation west of Monmouth, Oregon and, bottom, the aftermath of a flash flood that rushed down a small New Mexico stream after a stand replacing wildfire incinerated all of the vegetation along the stream course. Many federal biologists believe management (precautionary thinnings) in at risk forests poses a greater risk than wildfire. You decide.

However, some individual populations are capable of surviving such disturbances. Continued maintenance of diversity of fish populations depends on the existence of large, well-connected populations and spatially complex habitats. Rieman and others (1997) believed that if timber harvesting were increased to reduce risks of fire, it was possible and even likely that streams and salmonid populations would be damaged. They noted tradeoffs between reducing the risks of intense fires through active management and degrading habitat as a result of executing such activities. They made it clear that the risks of uncharacteristic fires to fish, as well as the potential damage to fish and habitat of reducing those risks through management, should be determined through evaluation and study (which can be called relative-risk assessment). Lurching to conclusions one way or another under the force of emotional or political rhetoric should be avoided.

It has been noted (Gresswell 1999) that long-term detrimental impacts on fish populations with resultant declines in native fish populations have been increasingly related to human activities. Rieman and others (2000) noted that although the characteristic low-intensity, more-frequent, smaller wildfires of the past may have contributed to maintenance of aquatic systems, isolated or small fish populations could suffer at least in the short term from uncharacteristic wildfire. Therefore, reducing risks of uncharacteristic wildfires could well be important to short-term survival of some fish populations, particularly in ecosystems that have already been fragmented. They note that while some argue that risks associated with active management may exceed risks of uncharacteristic fire, fish habitat and population recovery may be unlikely without management intervention where aquatic and surrounding terrestrial systems have been significantly changed. They go on to present a list of primary elements that must be integrated to guide successful management intervention.

Forest restoration proposals in support of the National Fire Plan, including silviculture and prescribed fire to reduce hazards and risks associated with uncharacteristic wildfire, entails analyses and decision-making processes required by the Endangered Species Act and the Clean Water Act. Examples of federal-agency approaches to such analyses give a picture of current approaches to management. In discussing timber management and related road systems, the U.S. Fish and Wildlife Service assumes that any effects of fire on bull trout habitat and populations in the Salmon River Recovery Unit in Idaho are subtle and less damaging than timber management activities to reduce fire risks (USDI 2002). No objective analysis was presented to support this assumption. A relative-risk assessment such as that suggested by Rieman and others (1997), comparing the long-term risk to bull trout from habitat degradation caused by uncharacteristic wildfire absent active forest restoration, to the near-term risk of habitat degradation caused by forest health treatments, would provide some means of objective analysis. In both cases, the primary factors are increased sedimentation and debris flows in stream channels, and heating of streams owing to removal of streamside cover.

The Draft Environmental Impact Statement for the forest plan revision for the Boise, Payette, and Sawtooth National Forests (USDA 2000) presented a short-term, risk-averse approach to restoration of forests prone to uncharacteristic wildfire. The approach, stated as an assumption on pages 3-52, was developed to guide plan implementation and to be consistent with the minimum

protection guides in the National Marine Fisheries Service and U.S. Fish and Wildlife Service Biological Opinions for salmon and trout. It also reflects Environmental Protection Agency protocols for delisting water-quality-limited water bodies under Section 303d of the Clean Water Act. The assumption was that short-term, risk-averse management alternatives would best respond to soil, water, riparian, and aquatic concerns. However, no relative-risk assessment was presented to support this assumption.

Brassfield and others (2002) prepared a position paper presenting the views of the Western Montana Level I Bull Trout Team on saving fish through reduction of risks. They concluded that any benefit from management actions to reduce long-term fire risks through large-scale thinning, fuel-break construction, or salvage logging to reduce fuel loading were unsubstantiated. They believed that fish populations would better respond to measures reducing immediate risks (barriers to movement, roads, exotic species, and fire suppression) than to projects undertaken to reduce fire intensity or size. Again, no relative-risk assessment was presented to support that assumption.

There are other examples applicable to Oregon, including insufficient and selective implementation of the Aquatic Conservation Strategy in the Northwest Forest Plan (USDA and USDI 1994) that illustrate the widespread application of the short-term, risk-averse policy throughout the Northwest by federal agencies. There is no evidence of relative-risk assessments associated with implementation of the policy.

Without detailed analysis, these examples either discount or accept the long-term effects of unmitigated risk of uncharacteristic wildfire on wild fish populations/habitat and on long-term ecosystem productivity. They either discount or ignore the observation of Rieman and others (1997) that "There is undoubtedly a point where the risk of fire outweighs the risk of our management, but that point needs to be discovered through careful evaluation and scientific study, not though the opposing powers of emotional or political rhetoric." They also illustrate the widespread occurrence of effective institutional and philosophical barriers to forest management through silviculture and prescribed fire to reduce risks of uncharacteristic fire.

Jim Petersen

Mechanical harvesters, like this John Deere/Timberjack machine, are excellent tools for thinning in overstocked forests—but only if the area in which the machine is working is large enough to yield sufficient timber to cover its operating costs. The machine (which is operating in one of Alberta's provincial forests) cuts, debarks and cuts logs to specified lengths—all in a single motion.

These barriers make clear that the "precautionary principle"(Morris 2000) is being applied in decision-making related to uncharacteristic wildfire risk and fish conservation in Oregon and elsewhere in the Northwest. The principle demands no action unless there is certainty no harm will result. The embodiment of the principle is the short-term, risk-averse policy of federal agencies that implement the Endangered Species Act and the Clean Water Act. As applied, the principle ignores, without inquiry, the potential harm from inaction. In a real sense, such decisions are based on ignorance rather than on knowledge and experience. An exception is the South Cascades Late Successional Reserve Assessment (Evenson and Hall 1998), which clearly states criteria to be met for silvicultural treatments to take place in LSRs. First, adverse short-term impacts to late-successional species must be determined to be less significant than the long-term benefits to those species, and second, such activities must not deteriorate the short-term function of the LSR to sustain species.

Assessment procedures discussed by Harkins and others (1999), Burton and others (1999), and Farris and others (1999) could and should be applied. It seems likely that such assessments would facilitate the necessary relative short- and long-term risk determinations.

Conclusion

Jack Blackwell (2001) (he was then Regional Forester of the Forest Service Intermountain Region) noted the frustration, anxiety, and feelings of helplessness experienced by personnel in his agency working with current interagency processes to determine impacts of management activities on threatened and endangered species. He also noted that projects anticipated by the USFS to have long-term benefits to ecosystems and species were often rejected by the regulatory agencies (U.S. Fish and Wildlife Service and National Marine Fisheries Service) because of the overriding concerns of these agencies over short-term effects. The regulatory agencies' short-term, risk-averse approach, with little attention to the long-term consequences of no action, made it increasingly difficult for managers to bring projects to fruition.

It is our opinion that short-term protection for species and water quality that blocks forest management to reduce long-term hazards and risks from uncharacteristic fire (Figures 9-2 and 9-3) could cause unintended, long-term detrimental effects to those same resources resulting from unmitigated hazards and risks. Ironically, the precautionary principle-driven short-term, risk-averse policy could lead to long-term deterioration of the very resources the laws are intended to protect (New 2001). One remedy is to develop and apply tools designed to compare the relative risks of habitat degradation in the near term caused by forest health treatments to reduce the likelihood of uncharacteristic wildfire, and habitat degradation in the long term from uncharacteristic wildfire

that would result in the absence of treatment. Risk assessments should be conducted based on current practices, knowledge, experience, and technology for silviculture, road construction, and fire management. Assessments based on effects of dated and unused practices would distort conclusions about contempory practices.

Conservation biology deals, in part, with protecting declining species (Meffe and Carroll 1997). Experience indicates that one of the greatest threats to such species is the risk of stochastic events such as uncharacteristic wildfire. This aspect of the impacts of uncharacteristic wildfire in Oregon (or elsewhere) has received, with few exceptions, little attention from conservation biologists and from agencies. Lacking needed attention, assessments of long-term risks of habitat degradation caused by uncharacteristic wildfire resulting from "no-action" management are generally absent, while assessments of near-term risks of habitat degradation from treatments to mitigate risks from uncharacteristic wildfire are largely inadequate. The real risks of both approaches must be assessed, compared, and understood in order to sustain federally listed and other species at risk in forests vulnerable to uncharacteristic wildfire. Specific methods and tools are critically needed for assessing the relative far-and near-term risks and benefits of management treatments in these forests. Primary goals of the Oregon Plan, the Oregon State Board of Forestry, and the Oregon Department of Fish and Wildlife are the protection, maintenance, and restoration of native fish and of biological diversity. These goals seem elusive without methods for analyzing relative risks and applying results.

The requirements of the Endangered Species Act often appear to dictate preservation of habitat, which is likely the easy part. The real test comes in what occurs as the habitat changes over time. This consideration challenges the suitability of near-term, risk-averse preservation. Federal land management decisions liberated from the precautionary principle could be greatly enhanced by comparison of risks of contemporary restoration treatments with those associated with the absence of such treatments. This all presents a paradox, which is perhaps the inherent Achilles heel of the Endangered Species Act and other environmental laws. That paradox, unless faced squarely, could ultimately thwart the achievement of the noble purpose of the Act: "…to provide a means whereby the ecosystems upon which endangered species and threatened species may be conserved…" A paradox is a statement that appears contradictory or unsupported by common sense but is nevertheless true. The common sense underlying most current management actions related to the Endangered Species Act is (1) that preserving habitat for listed species is critical, and (2) that the best or only way to preserve habitat is to preserve the ecosystem(s) on which the species depend. It may seem contradictory to say that *altering* the habitat is essential to its long-term maintenance. However, it seems that alteration may be exactly what is indicated by at least some assessments of relative risks. In such cases, managers must be prepared to accept the paradox and act.

Jim Petersen

This beautiful stream in Oregon's Mt. Hood National Forest lies within the municipal watershed that serves much of Portland. For years, scientists have warned that wildfire is inevitable if the watershed isn't thinned. But there is strong resistance to thinning from residents in the Portland area who fear thinning would hurt water quality. No fire yet.

This discussion should not be interpreted as an assault on the Endangered Species Act. While we concur with its purpose, it is time, and likely far past time, to examine what has evolved over the three decades since its passage, in terms of both judicial interpretation and managerial implementation. In particular, regulatory-agency reliance on the precautionary principle expressed as a short-term, risk-averse policy should be reviewed in context with the absence of relative risk assessments, while the long-term likelihood of uncharacteristic wildfires and resulting harm to listed species and to water quality increases.

In the spirit of adaptive management, particularly in considering short- and long-term risks and benefits, it is time for a new vision and an altered approach that provides an updated ecological context for implementing the Endangered Species Act. More to the point, it is past time to update the ecological context of the Act and its implementing rules and regulations. A requirement for relative risk assessments should be a significant part of the update.

In summary, much of Oregon's anadromous fish and bull trout habitat occurs in its eastern and southwestern regions where forests are generally at high risk from uncharacteristic wildfires. Precautionary principle-driven, short-term protection for listed species and water, coupled with policies that block forest management directed at reducing long-term damage from uncharacteristic fire, may cause long-term harm to those same resources because of unmitigated hazards and risks. Until relative-risk assessments are completed that compare the effects of forest restoration with those of management inaction, the prospects for survival and recovery of a vital part of Oregon's native fish legacy will remain unknown. Completion of such assessments must become one of the state's top conservation priorities.

LISTED FISH SPECIES IN OREGON

Common name population segment	ODFW status	Federal status	Federal agency
Chinook salmon			
Snake R., Sp/Su	T	T	NMFS
Snake R., Fa	T	T	NMFS
U. Willamette R., Sp	N	T	NMFS
L. Columbia R.	N	T	NMFS
U. Columbia R., Sp (WA)	A	E	NMFS
Coho Salmon			
S. Oregon, N. California	N	T	NMFS
Oregon Coast	N	T	NMFS
L. Columbia R.	E	C	NMFS
Sockeye salmon			
Snake R.	A	E	NMFS
Chum salmon			
Columbia R.	N	T	NMFS
Steelhead			
U. Columbia R. (WA)	A	E	NMFS
Snake R.	N	T	NMFS
L. Columbia R.	N	T	NMFS
M. Columbia R.	N	T	NMFS
U. Willamette R.	N	T	NMFS
Klamath Mt. Province	—	C	NMFS
Oregon Coast	—	C	NMFS
Goose Lk. redband trout	—	N	USFWS
Cutthroat			
Umpqua R. (sea run)	N	E	USFWS
Lahontan	T	T	USFWS
L. Columbia coastal (SW WA)	A	P	USFWS
Oregon coastal	—	C	USFWS
Bull trout			
Klamath R.	N	T	USFWS
Columbia R.	N	T	USFWS
Non-game Fish Species			
Oregon chub	N	E	USFWS
Borax L. chub	E	E	USFWS
Lost R. sucker	E	E	USFWS
Shortnose sucker	E	E	USFWS
Hutton Spring tui chub	T	T	USFWS
Warner sucker	T	T	USFWS
Foskett speckled dace	T	T	USFWS
Catlow tui chub	—	S	USFWS
Cowhead Lk. tui chub	—	S	USFWS
Goose Lk. Sucker	—	S	USFWS
Goose Lk. Lamprey	—	S	USFWS
Pit roach	—	S	USFWS

[a] E = endangered, T = threatened, P = proposed for listing, C = candidate species, S = species of special concern with conservation agreements, N = not listed, A = not applicable.

[b] E = endangered, T = threatened, P = proposed for listing, C = candidate species, S = species of special concern with conservation agreements.

Bonneville Power Administration

A spawning salmon

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By Bruce Vincent

PROVIDER PALS

In America today there is a large and growing resource linkage problem. Our largely urbanized culture (80% of Americans now live in urban areas) has lost track of where their 'stuff' comes from. We've all laughed at society's perceptions that 'milk comes in a carton at Safeway' and 'boards just show up at Home Depot.' However, this disconnection between consumption and production is problematic for all involved in addressing the difficult decisions we face in protecting the natural environment while providing the products society consumes. It is especially problematic for those of us who live in, work in, love and manage the environment.

This disconnect is hardly one sided. The realities of living in inner-city circumstances differ substantially from those in rural areas and we often know little about the environmental settings of our urban counterparts and the basis for their thinking on resource management issues such as forestry.

There is a program, Provider Pals™, that is designed to address this problem. The project has one very simple goal: build a common-ground bridge of understanding between the culture of inner-city urban youth and the culture of rural resource providing environmental stewards.

The program has four major areas of activity.

Adopting a Provider

Urban middle schools are selected in which to introduce the program. At each of the schools, individual teachers in the disciplines of either science or social studies have been chosen to present Provider Pals™ to their daily classes.

In the fall, each classroom chooses a resource providing culture (farming, ranching, logging, mining, fishing) to learn about. Provider Pals™ pairs this desire with a 'Provider' who is introduced to the students via video, letters, photo albums, and the Internet. The students, in essence, 'adopt' the Provider. The Provider Pal™ program also offers teaching tools to enable instructors to teach about our rural cultures and the modern processes of resource management that yield the every day products consumed or used by society.

"Being adopted and meeting the kids in class is one of the great experiences of my life"

Mike Poulson
Washington State

The exchange of information culminates in a one-day face-to-face springtime meeting between the Provider and his or her Pals. Each Provider will travel to their respective city, meet the students, and learn about the urban culture. Providers will bring their cultural work attire to the classroom to have the students 'walk in their shoes' and a photo will be taken and presented to each student in such attire. To conclude the program, Providers will offer the students a personalized certificate proclaiming them a 'Provider Pal™.'

Cities involved during the initial year include Washington, D.C., Libby, Montana, New York City, Detroit, Little Rock, and Oakland, California.

Rural Students Visit the City

Selected rural schools will provide the names of potential students to participate in a five-day cultural visit with their urban peers. The program is structured to allow the rural students time to meet with urban students in a classroom setting, enjoy a historical learning tour of the city, spend time visiting a manufacturing facility, and share in urban cultural events such as symphonies and professional sporting events.

Summer Program

Students from each of the urban areas will be paired with rural students from northwest Montana for a week of fun and learning in a rural setting. In 2003, the summer program for over 120 students will be held at the Historic Raven Natural Resource Learning Center in northwest Montana. The learning experience will be built around visits to farms, ranches, mines, plywood plants, sawmills and logging jobs.

The Web

To supplement and complement the classroom and summer camp learning experiences, the Provider Pal™ website provides continually updated information pertaining to each of the resource cultures represented by the adopted Providers.

The Provider Pal™ program was successfully test run in Montana and Washington, D.C. and gained the attention of the media. The Wall Street Journal called it 'the most exciting school initiative in years.' Ford Motor Company agrees and has given Provider Pals™ a $1.5 million donation over three years to build and expand the program. With additional funding in the coming years, new classrooms, schools and providers can be engaged.

In a nation as large and diverse as America, it is important that we have an understanding and an appreciation of our common ground and our differences. In gaining this understanding and appreciation we must have science-based information that is provided in understandable form in excellent publications such as *The Evergreen Magazine*. In the process of bringing this information to the public, however, there is no substitute for a personalized, human connection.

If you are interested in supporting Provider Pals™ with funding or with your time, please visit our website at www.providerpals.com; or contact us at (406)293-8822; or e-mail us at ppals@libby.org.

Forestland Certification: Meeting Society's Expectations While Expanding Shareholder Value

By John R. Olson, Vice President
Resource Management Division
Potlatch Corporation

In late 2002 Potlatch Corporation completed third-party certification of the company's 1.5 million acres of forestland in Idaho, Arkansas and Minnesota under both the International Organization for Standardization (ISO) 14001 Environmental Management System (EMS) requirements and the Sustainable Forestry Initiative (SFI SM) 2002-2004 standards. Although we regard third-party certification as a logical extension of Potlatch's cultural heritage of high

Tom Tracy

Potlatch's Idaho forestlands encompass popular recreation areas like Dworshak Reservoir, a prime residential and private recreational development. Under provisions of the proposed conservation easement, such areas will be protected in perpetuity from other uses that are incompatible with forestry and public access.

stewardship standards it also supports our broadening perspective of the values our forestland represents to our shareholders and society.

Third party certification should convey a clear message to society that Potlatch is fully committed to the principles of sustainability, which we believe is also a lynchpin for capturing potential new revenues streams from our valuable timberland asset. Perhaps the best way to illustrate this connection is to outline our recent agreement with the Trust For Public Land (TPL).

Just a few days after completion of the last regional audit for certification, Potlatch joined forces with the TPL in effort to collaborate in the development of one of the nation's largest "working forest" conservation easements. Under this agreement with TPL, we have committed to working together to evaluate important conservation areas in North Idaho and, over a period of several years, secure adequate funding for implementing conservation easements on much of the company's 670,000 acres. Terms of these easements will assure that the lands enrolled are sustainably managed for timber production in perpetuity. At the same time, the easements will secure the future of important non-timber values such as fish and wildlife habitat and recreation by forever protecting these lands from development and conversion to incompatible land uses.

In exchange for accepting certain restrictions on the use of our lands included in the easements, Potlatch will receive compensation based on an independent, fair-market appraisal of foregone value. Funding for the purchase of the easements will be raised through public and private sources using TPL's expertise in this area. Once completed, the easements will be maintained as part the national Forest Legacy Program, a congressionally created partnership with the states designed to protect private forestland from development that is inconsistent with timber production and maintenance of key non-timber values as well as public access and recreation. This federally funded program is administered by the states in cooperation with the U.S. Forest Service.

Tom Tracy

Potlatch has a long tradition of voluntarily recognizing and protecting special places like Walker Park, a stately grove of old western red cedars in north central Idaho. The grove was reserved for the public's enjoyment several decades ago. SFI's 2002-2004 certification standards recognize unique areas like Walker.

Without a structured performance certification process and the management practices it sets in place, an agreement of this kind would have been much more difficult, if not impossible, to reach.

Potlatch regards the partnering agreement with TPL as a win-win for society and our shareholders.

Established in 1972, TPL has already helped protect more than 1.4 million acres nationwide by addressing the financial interests of private landowners in preserving parks, greenways, community gardens and urban playgrounds. They have been especially successful in both finding and funding working easements on ranches, farms and timberlands and have completed several such projects in Idaho.

Supporters of TPL's approach to protecting forests and natural areas from development activity include Idaho's congressional delegation and its governor, all of whom view it as a way of preserving local economies while assuring protection of forest values, recreation and public access. Private landowners appreciate the fact that TPL's approach offers compensation for such assurances, a truly market based solution to this social concern. TPL has been instrumental in arranging financing for conservation efforts through grants from private institutions and individuals as well as government programs.

The Forest Legacy Program itself provides significant funding annually to states enrolled in this program. In 2002, for example, Congress appropriated $65 million nationally for these projects. We expect the Forest Legacy Program will be a strong source for funding of the conservation easements on Potlatch's Idaho lands.

Certification has proven instrumental for the initiation of the Potlatch-TPL project, and we also believe it can open the door to other sources of revenue from our forestland, sources we think offer opportunities to integrate society's expectations with the interests of our shareholders.

It is in the best interest of Potlatch's shareholders to promote and maintain public acceptance and trust. Public perceptions are instrumental in the formation of public policy, which directly and indirectly influences our ability to actively manage our lands and thus our company's profitability. The public now demands that private forestland owners manage their timber resources in an environmentally sound and sustainable way and, increasingly, to address a widening range of non-timber values —everything from protection of threatened or endangered species to preservation of unique landscapes and recreation sites. In recent years, the public's demands and expectations have been brought to bear on consumer choices as well. Because of their importance from both a market and a public policy perspective, public perceptions and expectations are carefully considered in Potlatch's business planning.

For most of the 20th century, claims and counterclaims from the forest products industry and its detractors have resulted in a battle of words and pictures aimed at influencing public perceptions and, ultimately, public policy. Sadly, truth

is often the first casualty in such a battle, which has produced a public weary of the conflicting claims by both sides and a longing for objective validation that industry practices meet these higher standards of environmental performance, particularly on private industrial forestlands.

Third-party verification provides assurance that private forest owners' practices are consistent with an accepted, independent set of environmental standards, processes and requirements, which offer segments of the public what they have indicated they desire. While a number of organizations have arisen in the last few years to provide this type of verification through various certification schemes, there are currently only two prominent players in the United States: The Forest Stewardship Council (FSC) and the Sustainable Forestry Initiative (SFI).

Tom Tracy

This rare and beautiful wildflower, the "Potlatch" Phlox, was discovered on company land in northern Idaho some years ago. In the 1990s, Potlatch worked with the state of Idaho to assure its protection.

We believe that the American Forest & Paper Association's Sustainable Forestry Initiative has established a credible certification program based on accepted forestry practices and good science. As long-time supporters of SFI, Potlatch has been a participant in the program's evolution.

Clearly, the forest products industry is large and diverse and, as a result, the SFI program is a product of that diversity. This past year the SFI program earned added credibility through a significant upgrade of its performance standard. The standard's enhanced on-the-ground performance measures include: protecting forests of exceptional conservation value, addressing procurement of all wood and fiber and establishing a united stand on elimination of illegal logging. SFI's six principles, 11 objectives, 34 performance measures and 118 core indicators assure sustainability and much, much more.

We believe the program now adequately addresses the public's performance expectations within a structured framework that permits Potlatch and the industry to continue its primary role as a supplier of wood fiber to society.

There is a perception, widely held by many environmental non-governmental organizations, that the Forest Stewardship Council requirements for certification are more environmentally stringent than SFI's. That perception, for better or worse, has translated into political and market pressures that have led some large retailers and some customers to openly express a preference for FSC certified materials and, in rare instances , even demonstrate a willingness to pay a premium for such products. Some argue that this may be an a emerging trend on the part of large retailers, although it can be legitimately argued that most rank-and-file consumers have not yet demonstrated a willingness to pay a premium for certified wood or paper products.

From the primary producers' perspective, however, it is becoming increasingly apparent that certification will become the price for access to certain markets. Longer-term it may become a broader standard for entry to all wood and paper markets worldwide. It just makes good business sense for us to view such market trends as opportunities and prepare to take advantage of them using a certification system that is most applicable to capturing that potential.

At Potlatch, since the mid-1970s, we have been developing a conceptual model for managing our forest resources that recognizes the importance of non-timber resources such as soil, water and wildlife habitat. We have employed professionals in hydrology and wildlife biology and were among the first to develop and integrate a Geographic Information System (GIS) into all aspects of land management. In the 1990s, we also incorporated non-timber resource information into the GIS, thus allowing our land managers to evaluate land management decisions from many resource perspectives. Potlatch has recently made an important organizational change by establishing our resource management program as a separate profit center within the company, allowing our resource managers to make independent, long-range management decisions using the most current information about the timber and non-timber resources involved.

This combination of business structure, professional skills and our use of emerging technology provided Potlatch with the tools needed to progress to forest certification, and also set the stage for a new approach to forestland management that encompasses a growing range of new revenue opportunities, including marketing certified wood products.

Though strong supporters of the SFI program, we have nonetheless kept an open mind on the applicability of alternative certification approaches and on making decisions that best meet our business goals. Our Boardman, Oregon hybrid poplar plantation is one example. Potlatch began the Boardman operation in the early 1990s to supplement fiber supply for our Lewiston, Idaho pulp mill. This operation utilizes agricultural practices in an arid, non-forest environment to produce hardwood fiber. When the contraction of Northwest pulp production significantly depressed

residual chip prices, we identified a promising new niche market for FSC-certified hardwood logs for use in non-structural hardwood lumber applications such as furniture framing. Because the SFI program is structured around forest management practices and does not incorporate agricultural approaches to fiber production, we considered the FSC's plantation certification program. It also offered Boardman a viable marketing opportunity. Boardman's eventual certification by FSC in 2001 was that organization's first certification of an intensively managed plantation in North America. Although we intend to also certify the operation under the ISO 14001 program, FSC represented a good solution to an immediate business challenge.

One of the primary criticisms of SFI continues to be its apparent lack of independence from industry. Those of us who have worked with that program, however, refute that claim by noting that SFI's governing board, the Sustainable Forestry Board, is now totally separated from AF&PA and consists of such diverse interests as environmental and conservation groups, public officials, professional and academic group and independent landowners and loggers. The board now "owns" the SFI standard, the application and certification of which requires repeated on-the-ground examinations of field performance.

At Potlatch we believe certification standards—regardless of their sponsorship—can best be achieved and maintained through application of a rigorous Environmental Management System (EMS) that ensures ongoing self-evaluations and continual improvement. We made the decision to work with the International Organization for Standardization (ISO) 14001 EMS process and to seek third-party verification that our EMS is consistent with those standards.

We were fortunate to already have in place a set of demanding internal environmental management standards that addressed such issues as streamside zones, water quality and threatened and endangered species. The company voluntarily initiated these standards of performance because we have had a long-standing commitment to a strong land ethic. We would also be the first to state that our manage-ment philosophy has and will continue to evolve and will be in-fluenced to some degree by public expectations. We believe this is essential for natural resource based companies like Potlatch.

Tom Tracy

Potlatch's 670,000-acre Idaho forest contains some of the region's most productive timberland—a result of fertile ash deposits that fell across the region following the eruption of southern Oregon's Mount Mazama some 6,800 years ago.

We are convinced that our standards and field performance will improve as a result of the follow-up, auditing and the double-checking defined by the ISO 14001 program. In actual practice, this has proven to be the case as our professionals have incorporated EMS-related experience in their resource planning and management activities.

Potlatch chose to certify under the newer SFI 2002-2004 standard, which as was just noted reflects expansion and improvement of various on-the-ground requirements. This combination of an ISO 14001 EMS and the newer SFI standards, we believe, provides one of the strongest certification programs that is available today.

The opportunity to reinforce our belief arose in mid-2002 when the respected Pinchot Institute invited Potlatch to participate, along with various Pacific Northwest state and tribal forest landowners and managers, in a comparison of its Idaho timberland management under the two primary forest certification schemes—SFI and FSC. The invitation appealed to us because no other private industrial forestland management organization in the U.S. has undergone such a comparison and because we have had experience with both SFI and FSC. We do not view the dual assessment as a competition between the certification schemes; both have both real and perceived strengths and weaknesses. But we do expect that the Pinchot Institute study will provide us with a unique opportunity to compare not only the schemes themselves, but also the differences in applicability and application of their audit protocols and processes. Our desire is to participate as an industrial forestland manager and offer perspectives that should help continual improvement of both FSC and SFI. The results of the Pinchot study should be published sometime in late 2003.

Where forestland certification may ultimately lead is impossible to predict. At Potlatch we view it as an opportunity to build on our long-standing commitment to sound forest stewardship by employing new information and technology in the quest for continuous improvement.

In doing so, we believe we can better meet both our shareholder's and society's changing expectations for forestland management, thus gaining the public acceptance and trust necessary to continue to operate in an economically viable manner. At the same time, certification provides us yet another tool for exploring new revenue streams for our shareholders by capturing previously unrealized resource values.

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