# Idaho Forest Health Conditions – 2002 Update*

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* This analysis updates portions of the *Forest Health Conditions in Idaho* (1993) report by Jay O'Laughlin and others. It is partly based on preliminary data released by the U.S. Dept. of Agriculture – Forest Service in April 2002, which are subject to change. Analysis was requested by the Idaho Forest Products Commission and the Idaho Council on Industry and the Environment for a forthcoming newsletter on forest fires, and the editor of *Evergreen Magazine* for a forthcoming issue on "The Truth About America's Forests" (700,000 copies of the 1994 version were distributed).

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## Abstract

Key indicators of conditions in Idaho forests declined between 1991 and 2002. Forests have become denser, mortality is at the highest level reported in 50 years, and growth rates are slowing. Related to these changes is an increased potential for severe wildfires, especially in the national forests comprising 73% of Idaho's forest lands. Active management can improve the situation, but national forest managers face barriers posed by a decision-making system in gridlock.


## Introduction

The report begins by analyzing recent data on key **Forest Change Indicators**.[1*] These include forest growing stock volume, species composition, and growth and mortality. **Change by Forest Ownerships** compares national forests (73% of Idaho forest land) to all other forests, consisting of forest industry (7 %), other private (11.5%), state (5.5%), and other federal forests (3%), primarily the Bureau of Land Management.[2] **Forest Fire Ecology** is such that conditions in national forests promote severe wildfires on three times as much land area as in the past. An **Active Management Approach** can improve the situation on national forests by reducing hazardous fuel accumulations. There are **Benefits and Costs** associated with active management. Research at western land grant universities shows that a **Comprehensive Silviculture** strategy targeting ecological restoration as well as fuel reduction offers greater ecological and economic benefits than the alternative approach of removing only small trees. **The Gridlock Problem** describes the decision-making process national forest managers must contend with.

This report draws no conclusions beyond those of nine years ago, when the University of Idaho report on *Forest Health Conditions in Idaho* found that the condition of Idaho's national forests was declining and would continue to do so unless active forest management was undertaken.[3] We identified the alternative to active management as reduced productivity, many dead trees, and fuel conditions favorable to large and potentially destructive wildfires. Subsequent reports by other researchers have reached similar conclusions.[4]

More than five years ago federal 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 the long-term ecological integrity of the [interior Columbia] Basin."[5] Since then, national forest management is less active by most any measure – e.g., agency budgets, numbers of personnel, timber harvests and other silvicultural treatments. One management activity that has increased is wildfire suppression.

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[*] Numbered **Endnotes** provide source references.

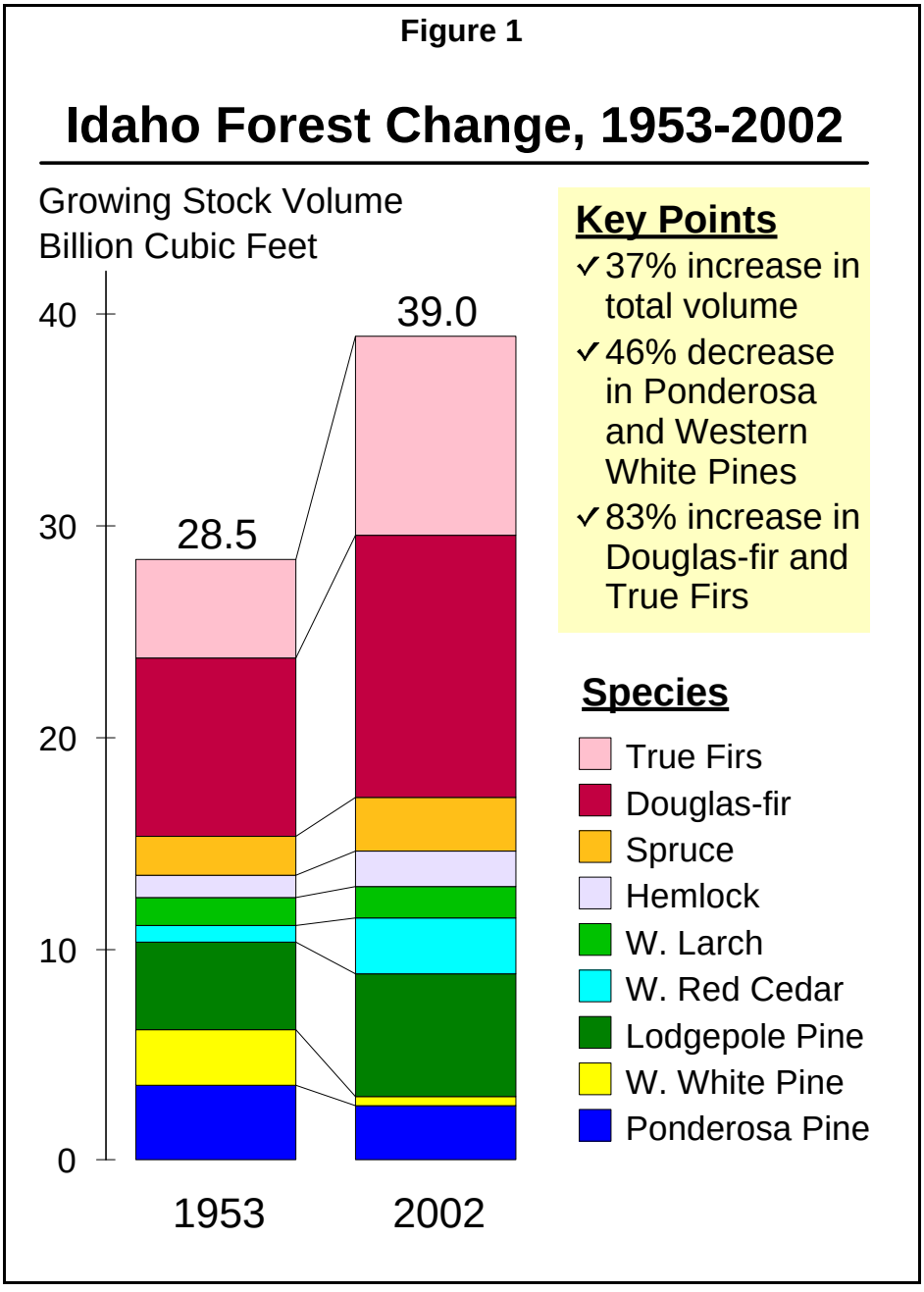
## Forest Change Indicators

Every ten years, the U.S. Department of Agriculture – Forest Service is required to assess and report on the condition of all of the nation's forests and rangelands.[6] Comprehensive forest inventories in Idaho were conducted in 1953, 1980, and 1991. While we await new inventory data, the Forest Service has published preliminary data for 2002 on which this analysis is based.[7]

In the past 50 years, Idaho forest species composition shifted while forest growing stock volume increased by 37% (Figure 1). (Growing stock includes trees at least 5 inches in diameter-at-breast-height.) More volume per unit area signals increased forest density. Much of the increase is in Douglas-fir and grand fir, while ponderosa pine and western white pine have decreased (Figure 1).

These changes favor insects and diseases that kill trees in great numbers during periods of stress, such as prolonged drought. Pines are more resistant to many insects and diseases, especially during drought conditions. Unlike pines, firs have branches from the ground up, providing "ladder fuels" that can turn otherwise beneficial ground fires into catastrophic crown fires, especially in dense stands.[8]

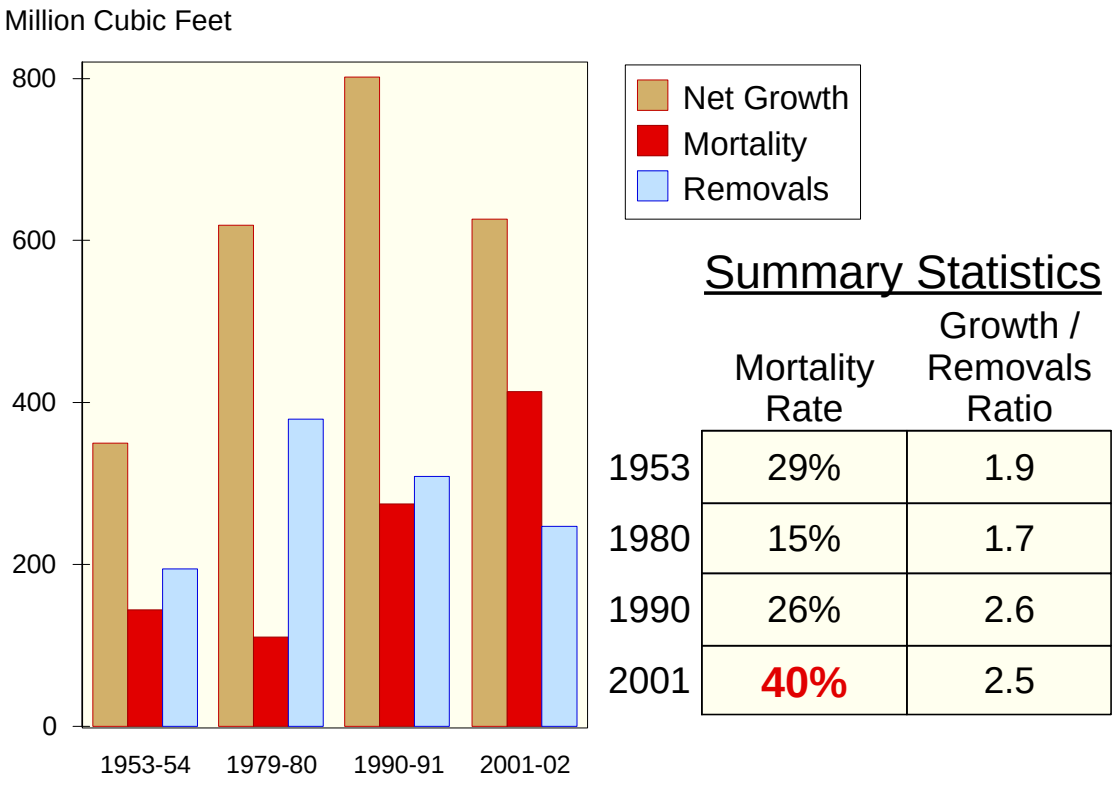
**Figure 1**



In the past ten years the level of mortality in Idaho's forests increased 50%, from 247 to 414 million cubic feet of growing stock volume. This is the highest statewide level of mortality reported since comprehensive forest inventories began. An increasing mortality rate describes a declining forest condition.

The mortality rate is now 40% of gross annual growth (Figure 2). Because of high levels of mortality, net annual growth declined from the previous measurement period for the first time in a half-century. Mortality now exceeds removals by 67% (Figure 2). This means flammable fuel from dead trees is accumulating in the forest.

**Figure 2**




Summary Statistics

| | Mortality Rate | Growth / Removals Ratio |
|---|---|---|
| 1953 | 29% | 1.9 |
| 1980 | 15% | 1.7 |
| 1990 | 26% | 2.6 |
| 2001 | **40%** | 2.5 |

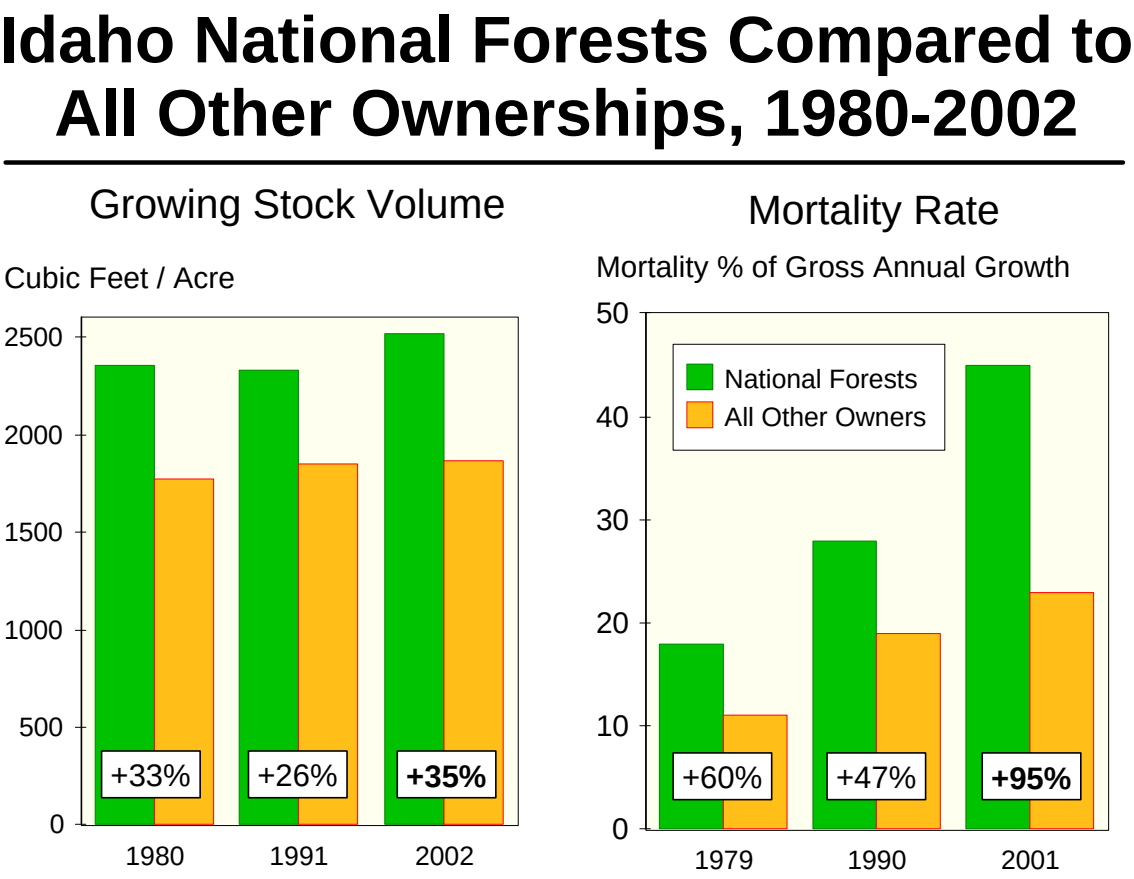
Annual removals, consisting almost entirely of timber harvests, have declined since 1980 (Figure 2). The growth/removal ratio in Idaho is higher, at 2.5 (Figure 2), than in any other major soft-wood timber producing state except Montana. National forests continue to add volume, becoming denser each year, whereas the state and many private ownerships generally practice sustained-yield management and harvest an amount of timber equivalent to the annual growth increment.[9]

## Change by Forest Ownerships

The majority (73%) of Idaho's forests are in the National Forest System administered by the Forest Service. National forests are a substantial feature of the Idaho landscape. They cover 20.4 million acres, or 39% of Idaho, a proportion much higher than any other state. Oregon ranks a distant second at 25%.[10]

Compared to all other owners (primarily state and private forests), Idaho's national forests are significantly denser, with 35% more growing stock per acre (Figure 3). The mortality rate on national forests has been significantly higher than that of other owners, and now is almost twice as high (Figure 3). The relationship of mortality and growth is an indicator of forest health.[11]

**Figure 3**




Active management has declined on national forests. For example, timber harvest volume from Idaho national forests declined 78% between 1991 and 2000.[12] If one assumes that state and private forests are managed the same way as they were ten years ago, then much of the increase

in tree mortality during the last ten years likely can be attributed to the increasingly denser stands in Idaho's national forests.

Across the U.S. in 2000, 8.4 million acres burned in the second worst fire seasons in 40 years.[13] More than half of the acres burned were in the Northern and Intermountain Regions of the Forest Service,[14] into which Idaho lands are split north and south along the Salmon River. No other state was affected by these fires more than Idaho, where 1,384,500 acres burned. Of those, 847,800 acres (61%) were on national forest lands, and 179,000 acres (13%) burned on state and private lands. Of the national forest lands that burned, 146,700 acres (17%) were in developed or "roaded" areas, with the remainder either in wilderness (528,700 acres) or undeveloped roadless areas (172,400 acres).[15]

## Forest Fire Ecology

Fire gave birth to, nurtured, and maintained forests in this region. Following the 1910 firestorm that swept across 3 million acres of northern Idaho and Montana, killing 87 people, we began to programmatically suppress fire to protect human life and property.[16] These objectives remain important. The unintended consequence was to exclude fire from performing several ecological roles. Those include consuming accumulated debris and rejuvenating grasses, shrubs and trees by releasing nutrients and growing space; wildlife flourish in a mosaic of burned and unburned patches.[17]

The area of Idaho national forests subject to lethal or catastrophic, stand-replacing fire is three times greater than it was a century ago.[18] This translates into approximately ten million acres of Idaho national forest lands subject to high-risk wildfires. 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]

The long-recognized major contributing factor to the severity of wildfire is the buildup of fuel.[20] Reducing hazardous fuels is a key management problem in the inland West.[21] As the U.S. Geneal Accounting Office put it, "The most extensive and serious problem related to the health of national forests in the interior West is the over-accumulation of vegetation."[22]

According to the Forest Service, forests and rangelands have accumulated an "unnatural buildup" of fuels, setting "conditions for unnaturally intense fires that threaten communities, air, soil, water quality, and plant and animal species."[23] Federal forests throughout the region have become more susceptible to outbreaks of insects and diseases as well as severe fire.[24] To a large degree, these forest health problems contributed to the severity of some of the 2000 wildfires, which were some of the worst in the last 50 years.[25]

Fires burn hotter today than before and with more destructive potential.[26] Severe fires put ecological values at risk, including water quality and species recovery, as well as homes in rural areas.[27] Forest health directly affects watershed conditions, including water quality, by regulating the amount, timing, and sedimentation of runoff.[28] When many fires are suppressed, the next fire burns more intensely, sometimes leading to severe soil erosion.[29]

## Active Management Approach

As forests become more dense, competition between trees increases for limiting factors, either moisture or nutrients, stressing the trees and alerting insects that trees are more vulnerable.[30] A pervasive forest restoration problem is reducing overly dense stands.[31] Active management practices include thinning dense stands of trees, using prescribed fire to cleanup debris such as logging slash and maintain desired forest stocking conditions, and regenerating more resistant and resilient tree species, especially ponderosa pine, western larch, and disease-resistant western white pine.[32]

Although we cannot make forests fireproof, active management can reduce hazardous accumulations of fuel. This is one of the goals of the National Fire Plan's 10-year comprehensive strategy and is closely related to another goal – rehabilitating and restoring fire-adapted ecosystems.[33] Although these goals are not disputed, the means for attaining them are, even among scientists.[34]

There are only two ways to reduce hazardous fuel: burn it or remove it. Many forests have accumulated fuel to the extent that it would be foolish to purposely ignite fires for any reason. Removing fuel from the site is accomplished by cutting trees and hauling them away. This involves either a thinning or timber harvest prescription to attain particular objectives, and logging to cut and remove the material from the site. (Logging is synonymous with timber harvesting.[35]) Prescribed burning can be used to consume the fine fuels left as logging debris or slash. In many forests, a combination of thinning, harvesting, and prescribed burning is needed. Each particular landscape has a different solution or combination of solutions depending on the type and number of forest health problems that exist and the values for which the land is managed.[36]

Many scientists believe timber harvesting is a necessary part of an ecological restoration program.[37] The Society of American Foresters believes that on federal lands where timber harvesting is permissible, it is an essential tool for sustainable forest management.[38]

The use of silviculture tools (thinning, harvesting, and prescribed burning) to attain fuel reduction and ecological restoration objectives in fire-dependent forests is straightforward, but not without risks. Foresters identify and mark all the trees that will contribute to the desired future forest conditions. Loggers cut and remove all unmarked trees. Following logging, foresters use prescribed burning to recycle nutrients and reduce surface fuels. When appropriate, prescribed burning is used periodically thereafter to kill underbrush and small trees.

The key consideration in choosing a silvicultural option is determining desired future forest conditions.[39] On public lands, the public must be involved.[40] Volumes and mixes of tree species removed can be viewed as a by-product of achieving goals of desired forest structure and landscape patterns.[41]

## Benefits and Costs

Healthy forests meet the current and future needs of people in terms of values, products, and services by maintaining appropriate forest structures, compositions, and functions across the landscape. Forest cannot meet social needs indefinitely without sustained ecological capacity to recover from human and "natural" disturbances.[42]

Inaction or passive management will allow some forest health problems to worsen.[43] 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.[44] The benefits of reducing forest growing stock volume in dense forests can be described in ecological, environmental, economic, and social terms.

**Ecological/Environmental Benefits.** Active forest management provides ecological benefits by reducing hazardous fuel levels and restoring sustainable conditions. Environmental benefits of harvesting timber from national forests include restoring early successional habitat for some wildlife, reducing fuel loads, and in some situations containing pest and pathogen outbreaks.[45] Active management can also reduce the risk of soil productivity loss and soil erosion that impairs water quality.[46]

**Ecological Risks.** Management, whether active or passive, involves ecological risks. Reducing risks from one source may increase risks to another ecological component, pointing to the need for an integrated approach to risk management as part of the decision-making process.[47] We do not have one fire problem, but many fire problems.[48] No single solution can address all of them.[49] Each problem situation requires site-by-site assessments and site-specific practices.[50] People with different perspectives on resources and risks will need to work together to develop sustainable solutions to fuel management problems, balancing one source of risk with others.

**Social and Economic Benefits.** Rural communities benefit when people are employed in local forests and processing facilities that manufacture wood products. The financial costs of fuel treatments are often thought to be high, but may be overstated. Research at western land grant universities on forests in Montana, New Mexico, southwestern Colorado, and northeastern Oregon has shown that comprehensive silvicultural treatments designed to restore sustainable ecological conditions can often pay for themselves.[51]

Although removal of wood products is not the primary purpose of forest resource management in the research reviewed, wood fiber is a valuable industrial raw material. In Idaho, softwood sawtimber – i.e., trees at least 9 inches in diameter-at-breast-height – comprises 69% of the growing stock volume.[52] Timber sold to processors provides revenues that can exceed the cost of fuel reduction and ecological restoration treatments, often by a large margin. Depending on forest conditions there may be considerable volumes of material in the 5- to 9-inch diameter class for which markets may not currently exist. The promise of substantial volumes of such raw materials might attract new capital for processing facilities for manufactured wood products or perhaps energy. In the research reviewed, timber harvest volumes were determined as by-products of a "comprehensive silviculture" approach designed to restore desirable ecological conditions.[53]

## Comprehensive Silviculture

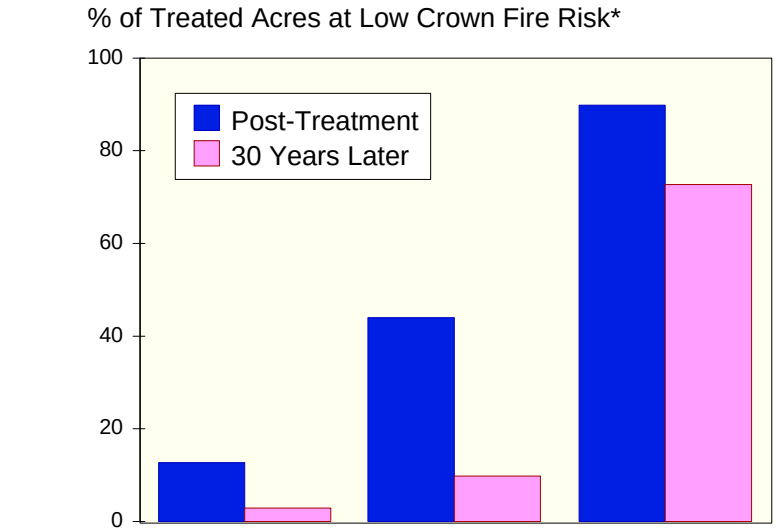
A primary objective of comprehensive silviculture is reducing crown fire potential and maintaining that condition over time.[54] By marking selected trees that will contribute to creating the desired future forest and removing all others from the site, a comprehensive silviculture prescription can attain the dual objectives of fuel reduction and ecological restoration.

Results of research at the University of Montana using computer simulations shows that whether it is viewed from a hazard reduction, ecological condition, or financial standpoint, the comprehensive approach is superior to prescriptions that remove only small trees.[55] The comprehensive prescription achieves greater hazard reduction immediately post-treatment and is less expensive to employ. It is also superior in terms of longevity and extent of effectiveness (Figure 4).

Montana has a total area of more than 5 million acres of short-interval fire-adapted forests in the high to moderate risk category. The small-tree removal option of thinning-from-below to a maximum of 9-inch trees would increase the percent of acres at low risk by a modest 13% immediately following the treatment. Thirty years later, only 3% of the treated acres would be in the low risk category (Figure 4). The comprehensive treatment was far superior, with 90% of the treated acres moved to the low risk category. Thirty years later, 73% of the comprehensively treated acres remained in the low risk category. Reducing the basal area by half, removing only smaller trees, is intermediate between the other two treatments in terms of immediate post-treatment effectiveness (Figure 4).

**Figure 4**

**Effectiveness of Hazardous Fuel Reduction Treatments, Montana**




| Treatments: | Thin-from-Below (< 9") | Reduce Basal Area by 50% | Comprehensive Silviculture |
|---|---|---|---|
| Average Net Revenue per Acre | -$664 | -$294 | +$624 |
| % of Acres Revenue > Costs | 0% | 20% | 51% |

* 5.1 million acres of Ponderosa Pine & Douglas-fir sites. Results from computer simulations. Low crown fire risk is when Crowning Index (wind speed to move fire from crown to crown) exceeds 50 miles per hour.

Source: Fiedler et al. (2001) University of Montana.

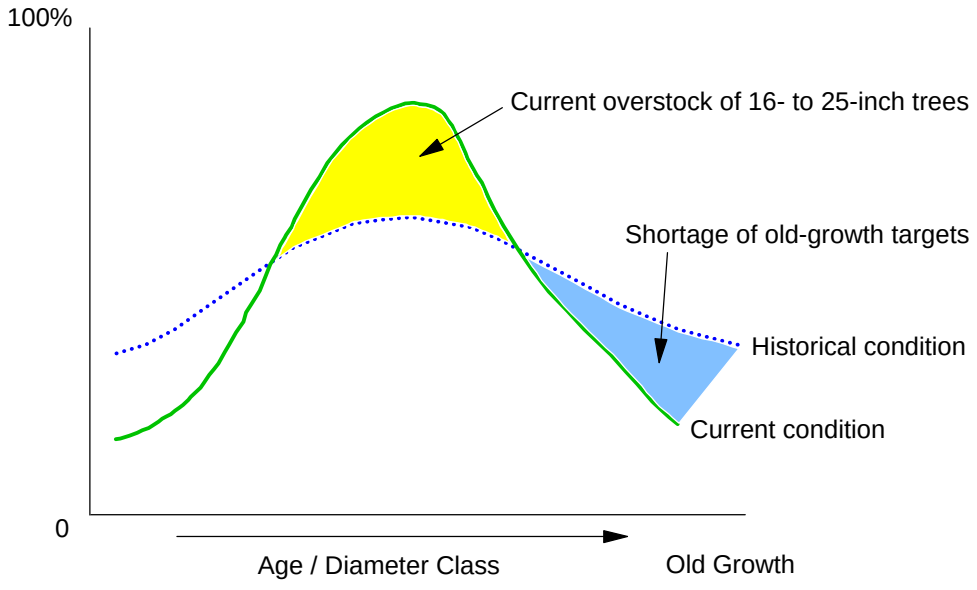
Some people believe there should be no commercial timber harvesting on public lands, or that only small trees should be thinned.[56] A bill introduced in the U.S. Congress to create federal legislation to prohibit commercial harvesting on national forests has 108 cosponsors in the House of Representatives.[57] The opportunities for progress in reducing the risks of severe wildfires would be reduced by the limitations some people would like to place on thinning projects, such as thinning only near human communities and limiting the size of trees cut to 12 inches.[58]

It may be counterproductive to focus only on fuel treatments without considering ecological restoration objectives. Previous management practices (fire suppression and logging) have reduced the percentages of young and old stands, while increasing the percentage of middle-aged forests.[59] Idaho's Nez Perce National Forest provides a case in point.

The Stewards of the Nez Perce National Forest are a group of concerned citizens, agencies, groups, organizations, and Nez Perce Tribe representatives working collaboratively to recommend stewardship goals, opportunities, and actions for the Meadow Face Analysis Area.[60] The Stewards believe forests should be managed to return both tree species and size classes to within their historic range of variability. This is done by comparing current age and diameter class for different forest types to ranges of historic conditions. There are currently some forest types that are overstocked with mid-sized trees in the 16- to 25-inch diameter class (Figure 5). To return to the historic range of variability, the 16- to 25-inch trees need to be reduced, retaining some of them for replacing larger old-growth trees.[61]

**Figure 5**

**Estimated Current Age / Diameter Class Percentage Compared to Historic Condition (Example)**




Source: Stewards of the Nez Perce National Forest (2000).

To implement comprehensive silviculture, managers need to be able to explain the rationale for alternative actions. Following public involvement to determine the desired future forest conditions, management objectives and actions may need to be modified. Then the manager can begin to improve ecological conditions by using an appropriate mix of thinning, harvesting, and prescribed burning.

## The Gridlock Problem

Forest health issues can be quite complex, and human values regarding what actions to take, or not to take, complicate forest resource management issues.[62] The policy response to forest health and severe wildfire problems was the development of a National Fire Plan – a long-term multi-billion dollar effort to address the situation.[63] Implementing projects to attain two of the Plan's objectives – reduce hazardous fuels and restore fire-adapted ecosystems – on national forests will be difficult in today's decision environment. The decision-making process national forest managers must deal with is broken.[64] Forest Service Chief Dale Bosworth calls the situation "analysis paralysis."[65] Others call it gridlock.[66] Public policies under the current system create barriers to active management, which are partly driven by apprehension some people have toward active management, including rationales based on forest health.[67] The result of gridlock is distrust and inaction.

Given the hazardous fuel situation today, some people find the consequences of inaction unacceptable.[68] Foresters know that active management, including timber harvesting, is a sustainable solution to the hazardous fuel problem.[69] National forests are not being managed to the extent necessary to reduce wildfire risks. As a result, 50.4 million acres are at risk of severe wildfire.[70] One scholar has suggested that the failure to deal with the fire situation is good reason to abolish the Forest Service.[71] There may be less drastic ways to deal with the situation. Citing the fire problem and centralized fire policies, another scholar has suggested pilot project experiments on selected portions of the national forests to test local collaborative approaches to management.[72] The state of Idaho has proposed several pilot projects for its national forests.[73]

The cure for the gridlock problem is not readily apparent, but likely will include methods of obtaining public consent for active management projects from affected groups of people under different sets of rules than currently exist. (The "Charter Forests" concept proposed in the Forest Service budget for FY 2003 may involve such ideas.[74]) Consent in the form of agreement about the desired future condition of forest landscapes would provide objectives for management for which actions to attain the desired condition can be developed.

Policymakers concerned about the national forests need to consider two things.[75] First, national forest managers need to be able to meaningfully engage all affected people to help determine the desired future condition of our national forests. Current policies allow administrative and legal challenges to such management decisions outside of required public involvement forums. The availability of alternative venues for challenges, including administrative appeals, can render the results of attempts to build consensus through the public involvement process meaningless. Second, national forest managers need the authority and the resources to do what needs to be done to attain the collaboratively-developed desired future forest condition objectives.

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