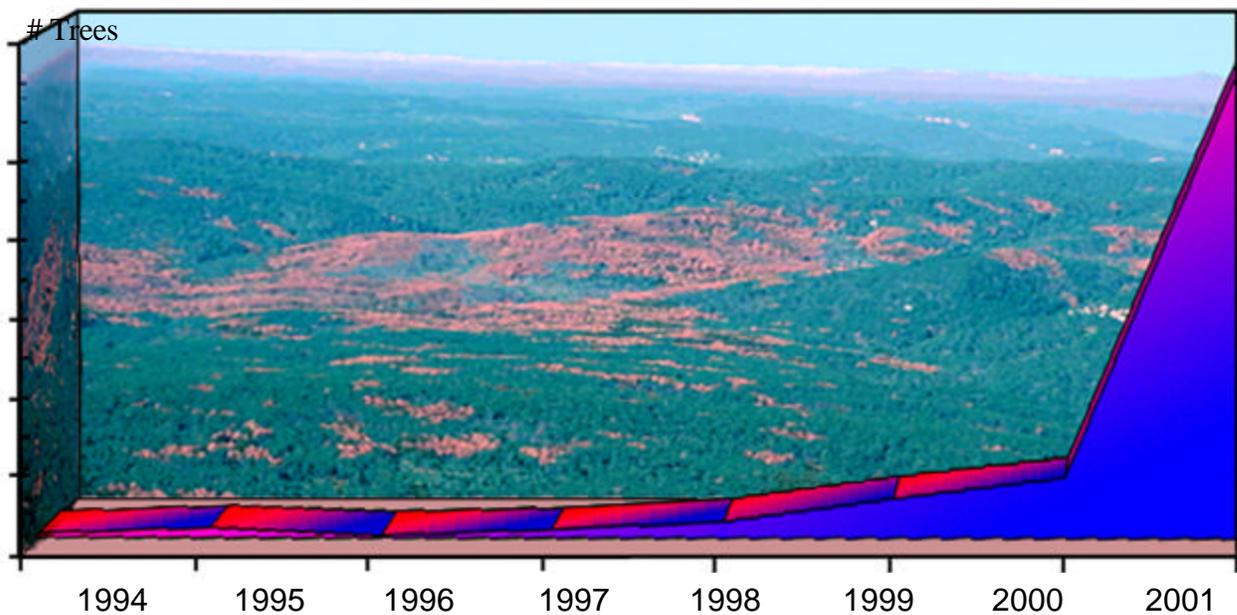


# WESTERN BARK BEETLE REPORT

## A Plan to Protect and Restore Western Forests

April 22, 2002



Mortality of ponderosa pine due to mountain pine beetle based  
on aerial surveys between 1994 and 2001

Prepared by

The USDA Forest Service in cooperation with the Western Forestry Leadership Coalition

# WESTERN BARK BEETLE REPORT

## A Plan to Protect and Restore Western Forests

### Executive Summary

Over the next 15 years, twenty-one million acres of western forests are at high risk of experiencing significant tree mortality caused by bark beetles. Tree mortality crosses all ownerships, boundaries and land use designations. High-value forested areas, such as developed sites, threatened and endangered species habitat, private lands, and visual corridors, have all been negatively impacted by bark beetle outbreaks. Tree mortality will increase dead fuel accumulations and increase the risk of wildfires that other efforts such as the National Fire Plan and the Western Governors' Association document entitled "*A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment – 10-Year Comprehensive Strategy*" are attempting to reduce.

This report, prepared by the Forest Service in cooperation with the Western Forestry Leadership Coalition, responds to a request initiated by the House Resources Subcommittee on Forests and Forest Health for a "report on what can be done to address the prevention, suppression, and rehabilitation needs related to bark beetle outbreaks in the West...."

This report focuses on restoring and maintaining forest health on all federal and non-federal lands across the West. The current trend is an increase in the number of acres susceptible to high levels of tree mortality. Fortunately, this trend is reversible. Success in this endeavor requires close cooperation among federal and state scientists and managers, non-governmental organizations, and the private sector.

This report is a multi-year, multi-landowner, multi-agency integrated pest management approach to the problems and challenges arising from bark beetle-caused mortality. It considers immediate concerns and links them to longer-term needs. The report is comprised of three key components: ***Prevention, Suppression, and Restoration***. Prevention actions are emphasized and are designed to change forest conditions that render them susceptible to bark beetles. Suppression actions are designed to suppress or control existing populations of bark beetles. Restoration actions reestablish forests that have been killed by bark beetles. All three components are needed to formulate an effective bark beetle management strategy. In order to improve forest conditions across the West, we must implement these key components while simultaneously increasing our knowledge through research, and developing a successful information transfer and public involvement process.

This report both complements and expands the goals of the National Fire Plan and other ongoing national efforts. It provides the mechanism to begin reversing forest health decline on forested lands adjacent to and outside the wildland-urban interface. Treatments recommended in this report will reduce competition, stress, and bark beetle susceptibility; restore resilient conifer species to the forests; and create diverse landscapes where bark beetles and fire function in their essential ecological roles. Management tools to implement this report are available, however, additional resources are needed to reverse this trend in forest health decline.

## BACKGROUND

Forest health is declining at a rapid rate in many areas of the West, and specific actions are required to reverse this trend. Bark beetles have killed millions of western forest trees in recent



**Without active management, excessive tree mortality will continue.**

years and outbreaks are predicted to accelerate. It is estimated that over the next 15 years, more than 21 million additional acres of Western forests, on both federal and non-federal lands, could experience significant tree mortality from bark beetles (Figure 1). These acres are at risk due to altered stand conditions, such as a dramatic increase in tree density, shifts in species composition, and an improper balance of stand age distribution across the landscape. Forest Service data indicate that growth of Western forests exceeds removals by three-fold. Without large-scale prevention treatments, events associated with high-risk forests will

continue to cause severe social, economic and ecological impacts. Bark beetles and fire will kill many trees before they reach the old growth stage, characteristic of the greatly-valued historic forests.

The bark beetles in Western forests today are the same species that have been present for millennia. They act as “agents of change” within the conifer forests of the West and play a critical role in the development, death, and rebirth of Western forests. The difference between current and historic outbreaks is the scale of interaction between the bark beetles and their hosts.

Present day Western forests are much more susceptible to large-scale tree mortality caused by drought and bark beetles than they used to be. Although large outbreaks are known to have occurred before European settlement, the landscape patterns of vegetation ensured that most disturbances were brief and spatially confined. The forests of today are much more uniform and dense, and are composed of a higher percentage of “climax” tree species. High levels of tree mortality result in loss of old growth, degraded watershed conditions, changes in species diversity and productivity, and loss in fish and wildlife habitat. These dead trees also add significant fuel loading to the forest. Extreme fuel loads pose a significant threat to property and life. Ultimately, forest health and associated social and economic values are lost.



**Bark Beetles are native to western forests.**



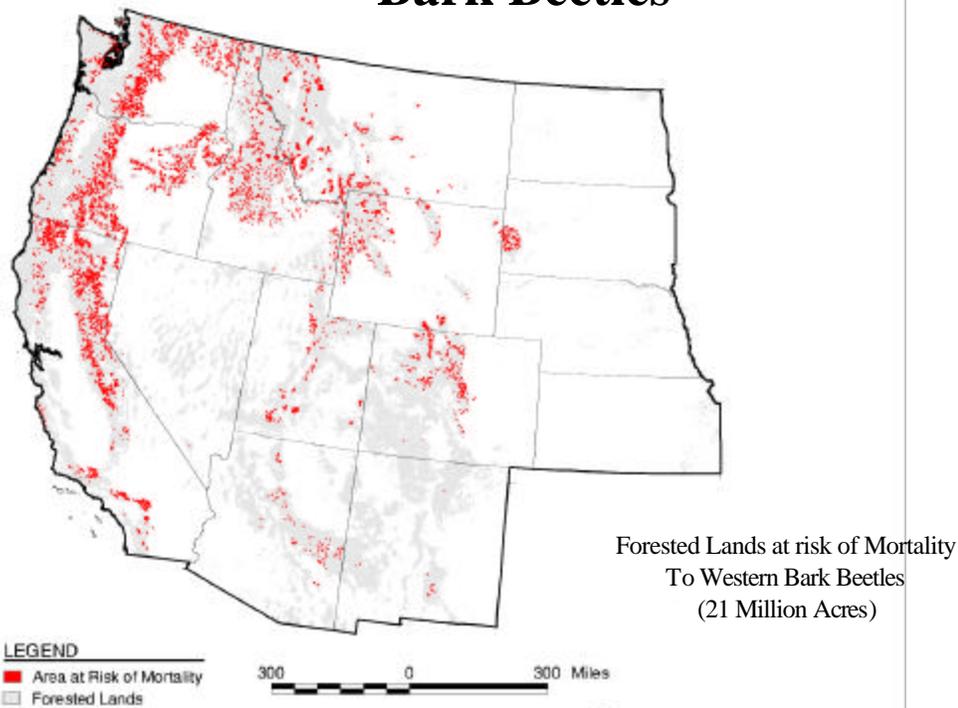
**Mortality caused by bark beetles increases the risk of catastrophic fires.**

This report spans 17 States and includes Forest Service Regions 1 through 6, and 10. It focuses on effective management actions that will prevent or reduce the negative impacts associated with bark beetle outbreaks. Treatment activities include *Prevention, Suppression and Restoration*. All three components are required for effective bark beetle management although prevention is emphasized. Reversing forest health decline through prevention will substantially decrease the future costs of fire suppression and other mitigation actions. Furthermore, it is more cost-effective to prevent bark beetle damage than to mitigate the impacts associated with it.

The National Fire Plan addresses situations in and near the wildland-urban interface. This initiative focuses on areas outside that zone and will maximize effectiveness by prioritizing treatment areas using available tools. Using existing authorities, treatments will be supported across all ownerships (including private landowners). Established reporting systems will be used to track accountability.

Prior to implementation of management actions, administrative processes necessary for compliance with federal laws including the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA) will take place where required.

Figure 1. **Forest Lands at Risk of Mortality to Bark Beetles**



Alaska not pictured for reasons of scale

## PREVENTION



**Overstocked stands are more susceptible to bark beetle attack.**

Over 21 million acres of the 362 million acres of Western Forest stands are at high risk from bark beetle-caused mortality. These stands are typically overstocked, over-mature, and/or lack proper species mix. Prevention is a proactive approach designed to reduce forest susceptibility to bark beetle outbreaks by changing forest conditions. Prevention presents the greatest opportunity for long-term maintenance of forest health in the West and is mainly accomplished by thinning forest stands. Prevention treatments reduce the risk of outbreaks on the landscape by creating a mosaic of species-mix and age distribution. These

treatments will ultimately result in lower fuel accumulation and ladder fuels, will lower risk of stand-replacing wildfires, and will help facilitate the re-introduction of safer, controlled prescribed fires. Such forests are less susceptible to bark beetle outbreaks and destructive fires. Hence, the long-term benefits inherent in such forests are gained for a fraction of the cost compared to reactive suppression or restoration efforts.

Prevention thinning is not a “cookie cutter” or one-size-fits-all approach. Not all forests are equally susceptible to bark beetle outbreaks. Less-susceptible forest ecosystems would not be a priority for treatment under this report. By managing susceptible stands properly, their risk can be lowered. Prevention treatments are more successful and cost effective than suppression treatments. Even though, suppression tactics are needed as part of an overall strategy, they are often short-term and are not initiated to modify existing susceptible stand characteristics. Since the conditions that have led to the decline of forest health have developed over many decades, prevention treatments to reverse this trend will also require years of action. Increasing both the amount and scale of prevention treatments will result in a decrease in the number of acres at high risk of mortality identified by the *National Insects and Diseases Risk Map*.



**Prevention treatment such as thinned stands are more resistant to bark beetle attack.**

To obtain the greatest benefits over large areas, prevention treatments must be encouraged and supported across all ownerships and boundaries. Technical and financial assistance must be provided to non-industrial, private forest landowners to assist with treatment costs. This initiative will complement ongoing State and Private Forestry programs that emphasize investments in multiple-ownerships, watershed-level, and fuel-reduction projects.

## SUPPRESSION



**Untreated blowdown often results in large scale mortality in standing forests.**

Current forest conditions and ongoing bark beetle outbreaks in the West require continued suppression efforts. Unlike long-term prevention treatments that reduce future mortality by altering stand conditions, short-term suppression strategies call for expedited treatments and are sometimes necessary to limit the negative impacts of ongoing outbreaks in high-value areas such as threatened and endangered species habitat, recreation sites, and municipal water supply. Depending on the bark beetle of concern, successful short-term suppression actions can include removal of potential and infested host material, such as blow down;

the use of pheromone baited funnel traps and trap trees to capture beetles; and the use of pesticides and anti-aggregation compounds to protect high value trees during an outbreak.

These short-term suppression strategies are effective and provide resource managers with valuable time during which to design and implement prevention treatments that will reduce bark beetle susceptibility risk and restore forest resiliency. Over time, a large-scale prevention program will decrease the need for suppression treatments.

This report recognizes the increasing need for suppression treatments of bark beetle infestations on all lands. Technical and financial assistance will be provided to both State and private forest landowners.



**Quick action reduces the food source for bark beetles, thus reducing outbreak risk.**

## RESTORATION

Restoration activities are essential to reduce the negative ecological and societal impacts associated with the change from green forests to dead trees. While some areas of dead forests are normal and necessary, the current epidemic will produce large areas of dead forests, some of which should be restored to produce benefits society values. These values include clean water, wildlife habitat, threatened and endangered species habitat, and a safe recreational experience. Restoration efforts covered under this report have the overarching goal to regenerate healthy forest ecosystems in beetle-killed areas.



**Heavy mortality requires restoration**

Aerial Survey data provided by the Forest Health Protection and the Forest Health Monitoring Programs from 1997- 2000 show bark beetles have caused high levels of tree mortality on more

than a million acres a year across all ownerships, boundaries and land-use designations. Bark beetle outbreaks have severely impacted several high-value areas, such as developed sites, threatened and endangered species habitat, private lands and Federal ownership adjacent to them, and visual corridors.

Restoration treatments include removing fuel loading, ladder fuels, and hazard trees, planting proper species mix, and restoring and protecting early successional habitat (accomplished through natural regeneration, artificial seeding, and/or planting). Specific restoration treatments will be implemented on a priority basis dependent upon the needs determined at the local level. These regenerated forests will provide resource values for future generations.

## **RESEARCH AND DEVELOPMENT ACTIVITIES**

Research has made outstanding progress toward developing new technologies that limit damage associated with bark beetle outbreaks in Western forests. Existing technologies provide needed tools to implement prevention, suppression, and restoration treatments that are effective. In some cases, additional research is needed to make these efforts more efficient. The research proposed in this report focuses on developing approaches and methods to prevent bark beetle-caused mortality. The research activities emphasize the following areas:

- Improve methods to predict where, when, and how much bark beetle activity will occur on a forest landscape;
- Clarify the results and interactions between bark beetle populations, wildfires and prescribed fires;
- Develop additional technologies for using natural attractants and repellents such as pheromones to protect forest resources; and
- Develop economical and environmentally-safe methods to selectively protect priority resource values on area-wide forest landscapes.

These areas of emphasis will improve the ability to predict bark beetle epidemics and protect priority resource values across forest landscapes, and help develop forests that will be more resistant to wildfires and bark beetle outbreaks in the future.

## **INFORM AND INVOLVE**

Clearly, in order to reduce the number of acres at risk in the West, there must be both internal and external participation and collaboration among Federal, Tribal, State and private land managers. A major thrust of this initiative is to develop and implement a communication plan that will inform and involve the public through enhanced understanding, acceptance, and support of this report. The collaborative goal of this report is to be responsive to the diverse needs of people who depend on forest resources. The initiative



**Public understanding is critical to success.**

embraces the ideals that a healthy watershed includes healthy communities and strong rural economic sustainability.

## LINKAGES TO EXISTING PLANS

This report focuses on general forest lands and complements the implementation of the National Fire Plan and its associated strategic documents, specifically: the Interagency Cohesive Strategy, *Restoring Fire-Adapted Ecosystems on Federal Lands, A Cohesive Strategy for Protecting People and Sustaining Natural Resources*; and *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment – 10-Year Comprehensive Strategy*. This report, along with other efforts, provides the mechanism to begin reversing forest health decline on forested lands outside the wildland-urban interface. The report endorses and embodies a collaborative approach to communities, ecological restoration, and the maintenance of forest health.

## MEASURING SUCCESS

Long-term success will come in the form of healthy, resilient landscapes at lower risk of catastrophic disturbances. Increased collaboration and partnerships resulting from this report will facilitate the long-term restoration and maintenance of forest health across all ownerships.

Regional treatment prioritization will focus on areas where the greatest accomplishment can be achieved or where “dovetailing” the provisions of this report into other programs will optimize on-the-ground accomplishment. Treatment prioritization will be integrated with other strategies, such as the National Fire Plan, as appropriate.

### ***Our Definition of a Healthy Forest:***

A condition wherein a forest has the capacity across the landscape for renewal, for recovery from a wide range of disturbances, and for retention of its ecological resiliency while meeting current and future needs of people for desired levels of values, uses, products, and services.

Implementation monitoring will occur at the local level and will be reported through normal reporting processes. The Government Performance Reporting Act (GPRA) measure of *acres protected* will provide immediate and cumulative accomplishment accountability.