September 2005

Southern Pine Beetle
Prevention and Restoration Program

Figure 1. Southern pine beetle (*Dendroctonus frontalis*) adult male.

Program Highlights

- **Program started in 2003.**
- **Funding levels have increased annually, with $14 million allocated in 2005.**
- **Over 50,000 acres have been restored to forest conditions under program guidelines.**
- **Over 100,000 acres in high-hazard pine stands have been thinned.**

Introduction

In 2003, the USDA Forest Service and the Southern Group of State Foresters initiated a proactive Southern Pine Beetle (SPB) Prevention and Restoration Program. Restoration activities are designed to return damaged areas to healthy forest conditions and to create stands that are less susceptible to future SPB infestation. Prevention activities are designed to improve forest health and therefore reduce SPB hazard, while still providing desired forest values. This program has led to the treatment (restoration and thinning) of more than 150,000 acres since its inception and has set a 10-year target of 2 million acres.

	Impacted Area *(Acres)*	Estimated $ Lost
Tennessee:	298,000	$500 million
South Carolina:	198,000	$350 million
Alabama:	203,000	$250 million
Kentucky:	190,000	$240 million
North Carolina:	135,000	$156 million
SUB-TOTALS		
Federal Lands:	261,000 ac.	$560.9 million
State/Private Lands:	712,200 ac.	$943.3 million
GRAND TOTALS:	1,000,000 ac.	$1.5 billion

Table 1. SPB Impacts: 1999-2003.

Figure 2. Large SPB infestation in the Turkey Hill Wilderness, Angelina National Forests, Texas.

Background

The southern pine beetle (SPB) (Fig. 1) is the most destructive and costly insect pest of pines throughout the South. From 1999 to 2003, SPB caused unprecedented damage in Alabama, Florida, Georgia, Kentucky, North Carolina, South Carolina and Tennessee. More than 1 million acres on private farms and forests, industry lands, State lands, national forests, and other Federal lands were affected (Table 1). The estimated economic cost of the outbreak was $1.5 billion. These losses severely impact the natural resource base that supports the South's tourism and wood-based manufacturing industries, and also destroys the habitat of threatened and endangered species, such as the red-cockaded woodpecker. In the aftermath of large infestations (Fig. 2), dead and downed trees provide abundant fuel for wildfires, and pose additional threats to transportation corridors and public safety. These factors contributed to the creation of the SPB Prevention and Restoration Program.

Extent of the Problem

Even though SPB populations have declined since 2003, epidemic populations will occur again and numerous high-hazard stands remain. The impact of future outbreaks in these high-hazard stands can be significantly reduced through healthy forest management. There are currently 15 million acres of pine forests in the South that are at risk of having 25% mortality in the next 15 years. The highest priority stands total 1.9 million acres, including dense stands of loblolly and shortleaf pine (Fig. 3 and Fig. 4). There are high priority stands in all 13 southern States.

Figure 3. High-hazard stand conditions.

Fund Utilization

From 2003-2005, SPB prevention and restoration funding totaled about $29 million ($3.6, $11.7, and $14 million for fiscal years 2003, 2004, and 2005, respectively [Fig 5]). The cooperative part of the funding, $20.6 million, is being used to create State-managed SPB prevention and restoration programs in all 13 Southern Region states. These funds are leveraged through a 50% cost share so that each Federal dollar spent results in a State dollar spent. Funds are being used to develop and utilize SPB hazard rating systems, to manage forests on non-industrial private forests and State-owned lands, and to educate landowners about the impacts of SPB and the need to maintain healthy forests to prevent SPB infestations. In 10 of 13 States, cost-share incentives are available to assist landowners in implementing these forest management practices. The Federal portion of program funding, $9 million, is being used to thin high -hazard pine stands and to restore forests impacted by SPB on 12 national forests. Funds are allocated and prioritized based on a demonstrated need and proven success.

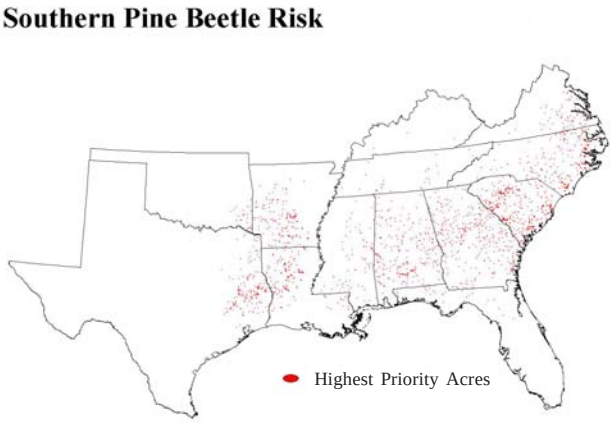

Figure 4. Highest priority acres at risk for SPB outbreak.

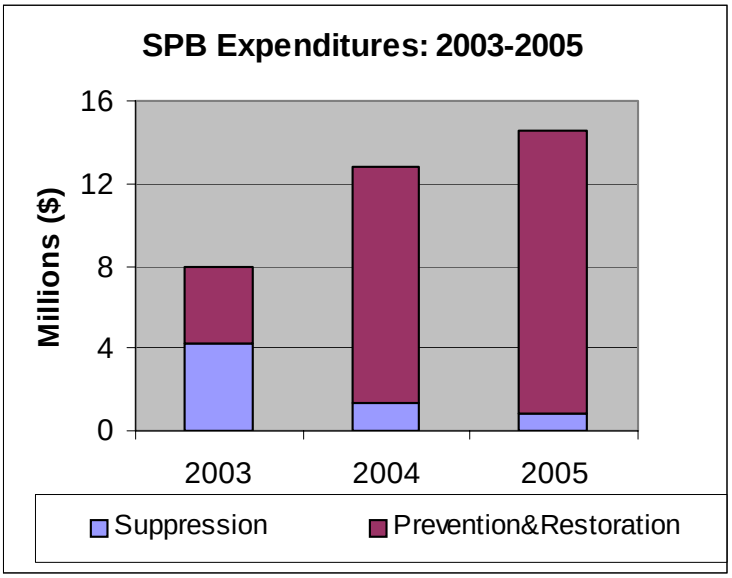

Figure 5. SPB expenditures from 2003 to 2005.

Management Activities Include:

Restoring pine sites

Thousands of acres were impacted by SPB in the last major outbreak between 1999-2003. Restoration efforts include planting less susceptible species, such as longleaf pine, on appropriate sites (Fig. 6). Program guidelines set a maximum planting density of 550 stems per acre for all pine species. This is a lower density than has been used historically when and where maximizing timber production is the overriding priority. Lower initial planting densities should reduce over crowding in later years which will delay or alleviate the need for future forest health treatments. In the first 2 years of the program 22,685 acres were planted under the program guidelines and there are an additional 31,798 acres scheduled for treatment in 2005.

Figure 6. Longleaf pine stand.

Thinning to improve forest health

Thinning is the preferred practice for reducing a forest stand's susceptibility to southern pine beetle and constitutes the predominant strategy of the prevention efforts (Fig 7). Thinning reduces intraspecific competition and promotes tree health. The resultant increased tree spacing also disrupts SPB spot growth. Program guidelines set targets to thin down to at least 450 stems/acre for pre-commercial thinning and to a basal area of 80 square feet per acre (+/-15%) for first thinnings. In the first 2 years of the program 66,868 acres were treated under program guidelines and there are an additional 36,084 acres scheduled for treatment in 2005. Thinning is best accomplished during periods when SPB populations are low.

Figure 7. Thinning to improve forest health.

Using fire to reduce competition

Prescribed burning is a forest management tool commonly used in southern pine forests to reduce understory competition (Fig 8). It can be used to treat a high number of acres at a low cost relative to other treatments. In the first 2 years of the program, about 20,000 acres were prescribed burned on State and private lands. In 2005, about 10,000 acres are scheduled for treatment.

Figure 8. Prescribed fire used to reduce understory competition.

Partnerships

Forest Health Protection has worked with the following partners to enhance the effectiveness of this program:

- All 13 States in the Southern Region
- 12 National Forests in the Southern Region:
  National Forests in Alabama
  Chattahoochee-Oconee NF
  Cherokee NF
  Daniel Boone NF
  National Forests in Florida
  Francis Marion and Sumter NF
  George Washington and Jefferson NF
  Kisatchie NF
  National Forests in Mississippi
  National Forests in North Carolina
  Ouachita NF
  National Forests in Texas
- Cooperative Forestry, USDA Forest Service
- Forest Management, USDA Forest Service
- Southern Research Station, USDA Forest Service
- Southern Group of State Foresters
- Forest Landowners Association

Conclusion and Future Direction

This program is a cornerstone piece to the Southern Region's comprehensive and integrated approach to managing SPB on Federal, State, and private lands. This program is a welcome shift in the management for SPB, putting increased emphasis on proactive integrated pest management strategies such as prevention instead of relying solely on attempts to suppress outbreaks once they are underway. Forest Health Protection has funded restoration and prevention work on 12 National Forests, and is helping to develop SPB prevention programs in all 13 states in the Southern Region.

These State programs have helped develop educational workshops and materials and directed prevention funds to over 1,000 non-industrial landowners. The forest management tools and strategies associated with this program are straight-forward and proven effective, but further research may enhance their effectiveness and reveal novel approaches. Forest Health Protection has established and strengthened relationships with several partners, including Forest Service Research via the Southern Research Station and Forest Management, to find ways to increase the efficiency of thinning older, dense stands of loblolly and shortleaf pines and to develop new markets for products of these removals.

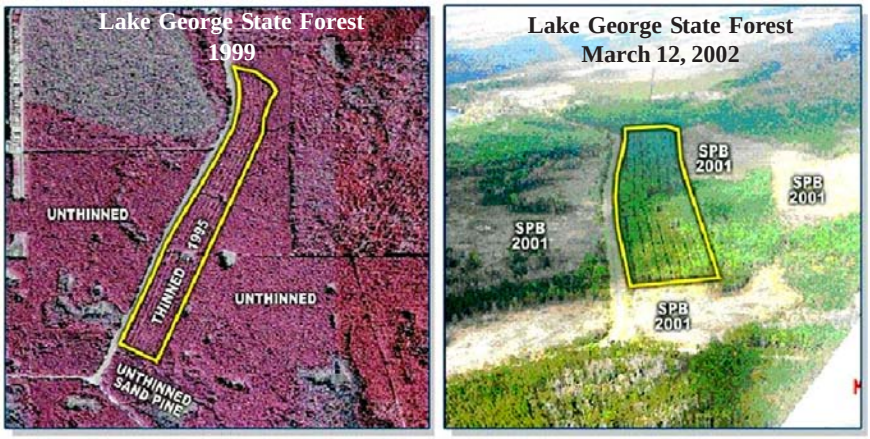

Figure 9. Forest stand thinned in 1995 unimpacted by area-wide SPB outbreak in 2001. Notice that adjacent stands were all harvested because of SPB-caused mortality. Photo: Florida Dept. of Agriculture and Consumer Services.

"By thinning your stands, you not only protect your investment by reducing the likelihood of bark beetle attacks, but also increase the growth and value of your stand." **Dr. Ron Billings, Texas Forest Service**.

"Many of our landowners are wary of replanting loblolly and facing the same situation in 10 or 20 years." **James Johnson, Georgia Forestry Commission**.

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