Projected Reductions in SPB Activity from Thinning in the Boswell Creek Watershed Project
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Stands highly susceptible to infestations of the southern pine beetle (SPB) (*Dendroctonus frontalis* Zimmermann) are generally characterized by a high percentage of sawtimber-size loblolly and/or shortleaf pines, dense stocking, and declining radial growth (Belanger and Malac 1980; Nebeker and Hodges 1983). High pine and total basal area are conducive to SPB attack and spread, and thinning dense stands is recommended to promote resistance to SPB (Hedden 1978; Hicks et al. 1980; Ku et al. 1980; Lorio 1978). Thinning serves to increase the host resistance of the residual pines, reducing the risk of attack (Brown et al. 1987). Increasing the distance between trees decreases the probability of spread of SPB to neighboring trees (Gara and Coster 1968; Johnson and Coster 1978). Thinning to reduce hazard to SPB is recommended when basal area approaches 120 ft^2/ac, and thinning back to 70-100 ft^2/ac decreases risk of SPB attack and spread. Infestations initiated in stands with a basal area of 70 ft^2/ac or less rarely expand beyond 5 trees (Nebeker and Hodges 1985).

The Boswell Creek Watershed Project includes the Four Notch area. This area was under consideration for wilderness designation in the early 1980s. SPB infestations developed, and no direct suppression measures were applied initially, allowing the infestations to expand. Cut-and-remove was eventually implemented, but ultimately 55% of the area (3796 ac) was impacted by SPB (Billings and Varner 1986). The large area impacted by SPB in the 1980s led to reduced losses in the 1990s, as much of the susceptible host type was killed. From data in the Southern Pine Beetle Information System (SPBIS), approximately 41 acres in the project area were affected by SPB in the 1990s, and the average infestation was less than 1 ac. This affected acreage was less than the average impacts on the National Forest in Texas in the 1990s, where just under 2% of the susceptible host type were affected on managed lands (Clarke and Billings 2003). Currently, regeneration and growth of pine has increased to the point that the project area is now classified as high hazard to SPB (A. Smith, TFS, pers. comm.). Over 4000 acres have basal areas of greater than 100 ft^2/ac, with over 1000 of these acres with predominately pine sawtimber (G. Elms, NFT, pers. comm.).

The Boswell Creek Watershed project proposes approximately 4,800 acres for thinning. Based on projections by Nebeker and Hodges (1985), thinning stands with a BA of greater 100 ft^2/ac should reduce losses to SPB by 50%, with thinnings in less dense stands reducing losses by 33%. If the next SPB outbreak on the National Forests in Texas occurs within the next 5 years and is similar in scope to the last outbreak, then losses to SPB within the project area scheduled for thinning should approach 100 acres. If thinnings are implemented prior to the outbreak, then reductions in spread of SPB would decrease losses to 50 acres. If we also assume that increased tree vigor will prevent initiation of 10% of infestations and that the average spot size is 1 acre, then the expected losses would decline to 45 acres. Belanger et al. (2000) found that SPB-caused tree mortality over a 10-year period in non-thinned stands of loblolly pine was twice as great as in thinned stands. Thinning also would reduce SPB population increase in the area, resulting in reductions in impacts on a landscape level. The benefits of thinning should carry over to subsequent SPB outbreaks as well. In summary, thinning dense stands now should cause significant reductions of the impacts of SPB within the project area.

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