

IMPACTS OF GYPSY MOTH DEFOLIATION

IN

STANDS CONTAINING WHITE PINE

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## ABSTRACT

This study investigated three forest types containing white pine (Pinus strobus L.) to determine the impacts of gypsy moth defoliation on white pine mortality, radial growth, and changes in species composition resulting from defoliation. Forest types studied included oak-pine, where white pine occurs in the understory, pine-oak, where white pine and oaks comprise the overstory, and pine. Plots were established in the spring of 1982 in defoliated and nondefoliated areas in the Arcadia State Forest in Exeter and Richmond, Rhode Island and on Providence Water Supply Board lands in Scituate, Rhode Island. In addition, some plots were located in the Pachaug State Forest, Voluntown, Connecticut.

The 1981-82 gypsy moth infestation resulted in severe (76-100%) defoliation of white pines when occurring in stands with oaks in the defoliated study areas in 1981. Defoliation of white pine was minimal in the study areas in 1982.

Foliage recovery was least successful for severely defoliated overtopped white pines. Fifty four percent of the understory pines in the oak-pine type, 32% in the pine-oak type, and 30% in the pine type showed signs of active refoliation 1 year following the gypsy moth infestation. Severely defoliated overstory pines exhibited

great recuperative powers. Eighty percent of those in the oak-pine type and 100% in the pine-oak type were judged to be in good condition in 1983.

Tree mortality following defoliation was substantial for understory white pines. Forty percent of the stems present at the time of defoliation in the defoliated oak-pine stands were dead or dying 1 year following defoliation. In the pine-oak and pine stands 62.4% and 62.2% were dead or dying 1 year following defoliation. Understory white pine basal area losses 1 year following defoliation were also high being 42.5, 38.7, and 43.2% for the oak-pine, pine-oak, and pine types respectively. White pine losses for all stems combined (understory and overstory) were high only in the oak-pine type where 33.7% of the white pine basal area was lost. Basal area losses for understory pines in control stands was 7.8, 22.2, and 8.7% for the oak-pine, pine-oak, and pine stands, respectively. Basal area losses for all white pine stems combined were negligible.

White pine radial growth decreased significantly during the study period in both defoliated and control stands. Average decline in radial growth was 22% for defoliated understory pines and 35% for understory pines in control stands. Pine growth reductions were similar in the overstory averaging 38% in defoliated stands and 27% in control stands.

Changes in species composition resulting from gypsy moth defoliation were noted in the defoliated oak-pine and pine-oak stands. White pine relative stem densities following defoliation were 8.1% less in the defoliated oak-pine stands and 13.4% less in the defoliated pine-oak stands compared to densities at the time of defoliation. White pine relative basal area was 7.8% less in the defoliated oak-pine stands compared to that present at the time of defoliation.