Growing Stock Levels in Red Pine

"Ecology and Silviculture of Northern Lake States Forests"

A research work unit of the USDA Forest Service North Central Research Station

1831 Hwy 169 E.
Grand Rapids, MN 55744

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Study Briefing

Established 1949, Cutfoot Experimental Forest, Minnesota

Extended rotation stands are rare in most regions, but will likely be more common in the future because of the high conservation value placed on old forests. Quantitative data on growth and yield of extended rotation stands are not common, making economic predictions and ecological expectations challenging to assess. This reflects the practice of basing rotation age on culmination of mean annual volume increment (CAI) in unthinned stands, without necessarily factoring in the influence of periodic thinning on growth. We are studying extended rotation red pine (*Pinus resinosa*) stands to better understand the ecological and growth and yield consequences of managing long-lived species beyond the traditional rotation age (70-90 years for red pine). Our study utilizes a level of growing stock study that was installed in 85 year-old red pine stands in 1949. Treatments consist of five levels of growing stock basal area that range from 60 to 140 ft^2/ac.

60 BA. Balsam fir *(Abies balsemifera)*, red oak *(Quercus rubra)*, and white pine *(P. strobus)* are regenerating into the mid-canopy.

140 BA. Shrubby hazel (*Corylus* sp.) dominates the understory.

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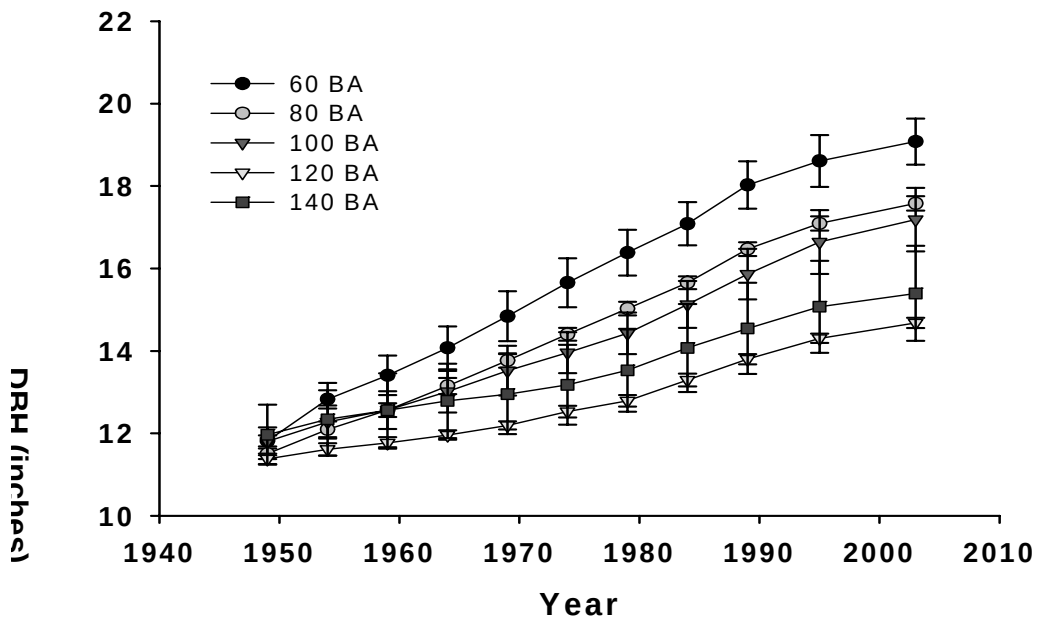
The stands have been thinned five to seven times with another thinning planned for winter 20005-06. By age 138, mean annual increment had not culminated in the low basal area treatments, holding steady at around 36 ft^3/ac/yr. Mean annual increment in the higher basal area treatments show signs of culmination between ages 115 to 135 years. Our study reaffirms a growing belief that CAI has limited value for determining rotation age, given objectives that are more inclusive of conservation and ecological goals. This study also reflects the value of long-term experiments, established for other reasons, for addressing new silvicultural and ecological questions.

Mean Diameter by Stocking Level



Current Investigators: Brian Palik and Christel Kern.