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Indicators of regenerative capacity for native broadleaf forests: a case study of ungulate overpopulation in the Eastern United States

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It is well known that overpopulation of ungulates can devastate forest regenerative capacity; however, few studies have quantified this impact over large areas. Data from the USDA Forest Service, Northeastern Forest Inventory and Analysis Unit's inventory of Pennsylvania are being used to monitor forest understory communities. The Pennsylvania Regeneration Study addresses a fundamental need for new indicators of regenerative capacity for managed and unmanaged native broadleaf forests. Understory vegetation of this region often is dominated by species that are not preferred as deer food or are highly tolerant of browsing. The region's forest composition and dynamics, and ambient high populations of deer make it an excellent case study on indicators of regenerative capacity. This paper describes an approach that compares the composition of the existing regeneration component to thresholds representing "sustainable levels." The proposed indicators address issues of natural regeneration of native forests that are not currently included in the Montreal Process Criteria and Indicators. Applying stocking thresholds to the sample data provides estimates of the proportion of forest that does or does not meet accepted silvicultural guidelines for advance tree-seedling stocking. One-half to two-thirds of the region's forests would require remedial treatment to ensure adequate regeneration following harvest if replacing the existing canopy is the management objective. These results are controversial because solutions to regeneration problems can require radical and expensive forest management treatments that often conflict with other resource values. General constructs of this approach could be adapted to compare existing regeneration to sustainable levels in any forest setting where guidelines exist. One advantage over the long term is that results will include data sufficient to distinguish between advance and post-disturbance tree seedling stocking levels.

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