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## Overgrazed Ecosystems: Do Plant Communities Recover?

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Large herbivores, such as white-tailed deer (*Odocoileus virginianus*), are major determinants of the structure and composition of forest plant communities. Previous studies of herbivory have examined plant community response by focusing primarily on diversity indices or single plant species. Few studies have shown whether statistically significant changes in species composition have occurred. In this study we used ordination analyses (DCA, CCA and RDA) to examine the effect of biomanipulations including exclosures and removal of deer on plant species composition and the dynamics of southern Ontario forests in the Canadian region of the North American Eastern Deciduous Forest or Carolinian Zone. In 1992, 1995 and 1996, plant communities in forest stands with high deer densities (50 deer/km<sup>2</sup>) were compared with adjacent plots closed-off to deer in 1978, 1991 and other long-term ungrazed sites. Stands where deer were reduced in 1993 from 10 to 50 individuals/km<sup>2</sup> were also examined. Ordination showed that older exclosures were similar to ungrazed sites and dominated by native plant species. Both differed significantly from grazed sites, which were dominated by non-native species. Newer exclosures and stands where deer densities were reduced differed from both grazed and long-term ungrazed sites. This suggested an intermediate or alternate recovery trajectory with implications for management decisions about plant species conservation and re-establishment. Herbivore-mediated changes in light regimes at the forest sub-canopy may be a factor in preventing native plant communities in overgrazed sites from recovering and may also be determining the trajectory of some plant communities over time.