



Monitoring Forest Vegetation at Voyageurs

- Terrestrial vegetation serves as an integrated measure of terrestrial ecosystem health by expressing information about climate, soils, and environmental disturbance, as well as browsing pressure and invasion by non-native plant species.
- Terrestrial vegetation serves as a base for the food web of other ecosystem components.
- The predominance of forests across the region makes comparisons across Great Lakes Network national parks feasible and a topic of interest to park managers.



Long-term and Regional Comparisons

Vegetation monitoring at Voyageurs is part of a long-term program being conducted in all nine national parks of the Great Lakes Network to detect forest change and to draw inferences about forest health so that management recommendations can be provided to Network parks. Our primary objective is to detect change directly in forest attributes, and a secondary objective is to test for change in other indicators associated with vegetation, including succession and coarse woody materials. Monitoring involves collecting data on trees (species and diameter at breast height [DBH]), saplings (species present and abundance), shrubs (species present and percent cover), ground layer (abundance by species), and coarse woody material. Thirty-eight plots were established among four habitat types at Voyageurs National Park in 2008. Each park is visited once every six years.

What We Are Finding at Voyageurs

- Conifer density was highest among the smaller size classes in most habitats, indicating healthy regeneration. Jack pine was the exception, reaching its greatest density in the 22.5 to 30.0 cm DBH size classes, with only a minimal number of smaller trees (<10 cm DBH). Additionally, there were very few red pines at all, and no red pine seedlings were found in any plots.
- White cedar was only found in larger diameter classes (>15 cm DBH), and even though it was the most common species in the web-mesic/wet habitat, no seedlings were found in any plots.
- Tree species exhibiting healthy reproduction reach their greatest densities in the smaller size classes and decline in number as the size classes increase. The reverse situation suggests impaired regeneration.
- Fire suppression is most likely causing reduced regeneration of jack pine.
- Reduced white cedar regeneration is likely due to high deer browse pressure, which is a serious problem throughout the upper Midwest.
- Both jack pine and white cedar are the keystone species in their respective habitats. If left unchecked, the altered disturbance regimes created by fire suppression and deer browse will cause cascading effects throughout the ecosystem. Many wildlife species that are dependent on open habitats associated with burning (black-backed woodpecker and spruce grouse) are already uncommon here.



The Great Lakes Inventory and Monitoring Network is a group of nine national parks in Minnesota, Wisconsin, Indiana, and Michigan that share similar management issues. The Great Lakes I&M Program office is in Ashland, Wisconsin. Program staff work with managers at each of the nine parks to develop long-term scientific monitoring programs that help to track the "health" of natural resources and provide information for making management decisions. Visit us online at <http://science.nature.nps.gov/im/units/glkn/>.