Monitoring Forest Vegetation at Pictured Rocks

Importance

- 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 is a base element of the forest food web.
- The predominance of forests across the region makes comparisons across Great Lakes Network national parks feasible and a topic of interest to park managers.

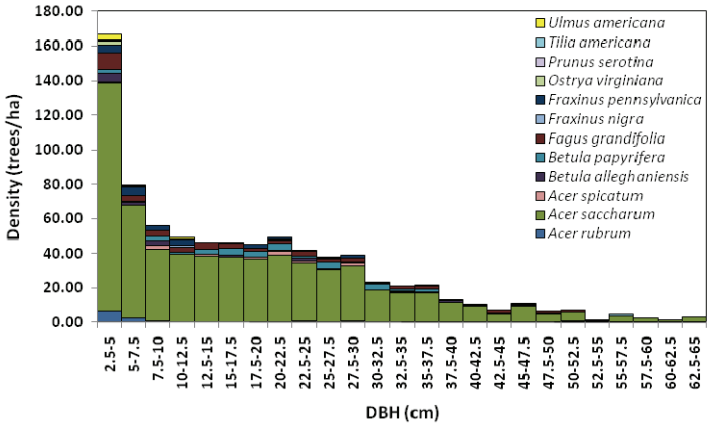
Status and Trends

Fifty-nine vegetation monitoring plots were sampled at Pictured Rocks National Lakeshore in 2009. They are distributed among five habitat types: 1) very dry to dry, very poor to poor nutrient availability; 2) dry to dry mesic, poor to rich nutrient availability; 3) mesic, poor to medium nutrient availability; 4) mesic, medium nutrient availability; and 5) mesic, medium to rich nutrient availability. There was also one cedar swamp plot which did not fit into the classification scheme.

We are collecting data on trees, saplings, shrubs, ground layer herbs, and coarse woody material, with the primary objective being to detect change directly in forest attributes while also testing for change in other indicators associated with vegetation, including succession, browse, and disease.

Management Implications

- 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.
- In the driest habitat, jack pine and red pine densities were greatest in the 10-20 cm DBH size classes, with only a minimal number of smaller trees (<10 cm DBH). Additionally, seedling density of these species was low (<70 seedlings/hectare [ha]). Such conditions, combined with the absence of fire, will lead to a white pine-dominated system then, ultimately, to hardwoods.



Density-diameter graph of hardwoods in mesic, medium to rich habitat. Note how sugar maple (*Acer saccharum*) dominates all of the size classes.

- In mesic habitats, forests were dominated by sugar maple (*Acer saccharum*) with a lesser component of beech (*Fagus grandifolia*) (graph). The presence of other tree species was limited, although historically, yellow birch and hemlock were also well represented here. The creation of gaps near seed sources and nurse sites (tip-up mounds and rotting logs) could promote the growth of these two species.
- Beech scale, one of two components in the beech bark disease complex, was observed on over half of the beech trees in mesic habitats (photo). However, the degree of infestation on individual trees was low, ranging from 1-17% in the four habitats where present.
- Beech bark disease is now a pressing problem in the park with the "killing front" moving through the eastern portion of the park. Management of the disease should focus on identifying and promoting the reproduction of resistant genotypes within the killing front.

Beech tree heavily infested with beech scale.