



Monitoring Forest Vegetation at Isle Royale

Importance

Vegetation is a base element of the forest food web, and 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.

The predominance of forests across the region makes comparisons across Great Lakes Network national parks feasible and a topic of interest to park managers.

Because changes in plant communities occur over relatively long time periods, we are monitoring vegetation at each of the nine Network parks on a rotating 6-year cycle; our next visit to Isle Royale will be in 2016.

Status and Trends

Fifty-two vegetation monitoring plots were sampled at Isle Royale National Park in 2010. They are distributed among five forest types: 1) balsam fir mixed forest; 2) white spruce/trembling aspen mixed forest; 3) paper birch; 4) cedar; and 5) sugar maple.

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 (typically <10 cm DBH) and decline in number as the size classes increase. The reverse situation suggests impaired regeneration.

In paper birch forests, paper birch density was greatest in the 15-17.5 cm DBH (diameter-at-breast-height) size class, with lower densities in increasingly smaller size classes. (Figure 1)

Browse pressure at Isle Royale in 2010 was low, with only paper birch mixed forests and white spruce/trembling aspen forests having significant browse (>10% of individual shrubs browsed).

Three understory herbs (large-leaved aster, rosy-twisted stalk, and gay wings) that were abundant in balsam fir forests in 2010 were not listed in the report from a 1910 expedition to Isle Royale. This suggests a large abundance increase of these species in the past 100 years.

Managers should continue to monitor snags and coarse woody material on the island, as they provide habitat. This is especially relevant for the marten (*Martes americana*). Our efforts showed a high amount of standing, large-diameter, dead trees, but no advanced decay of coarse woody material. Both are key for marten habitat.

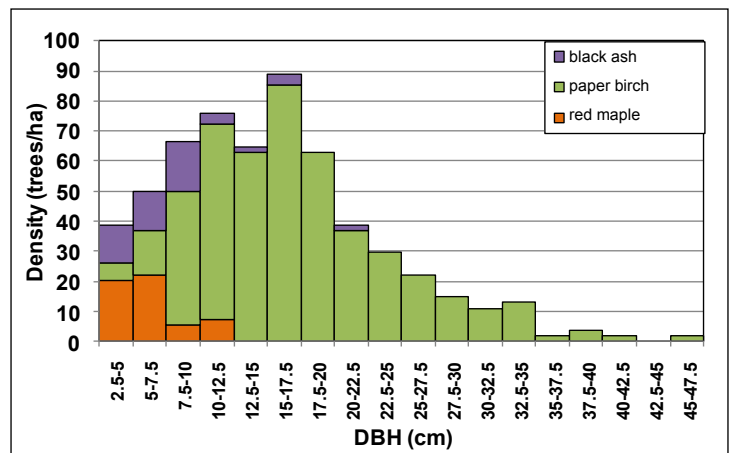


Figure 1. Density-diameter graph of hardwoods in birch forests. Note how paper birch is not successfully regenerating.

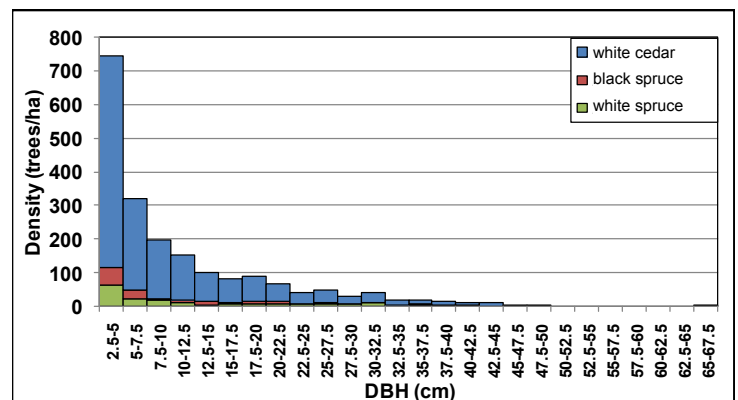


Figure 2. Density-diameter graph of conifers in cedar forests. Note how cedar dominates all of the size classes.