



Monitoring Forest Vegetation at Sleeping Bear Dunes

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 vegetation monitoring plots were sampled at Sleeping Bear Dunes National Lakeshore in 2009. They are distributed among five habitat types: 1) very dry to dry, nutrient poor; 2) dry to dry mesic, poor to medium nutrient availability; 3) mesic, medium to very rich nutrient availability; 4) Mesic to wet mesic, nutrient poor; and 5) plantation.

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, white pine (*Pinus strobus*) density was higher in successively smaller size classes, indicating strong regeneration (Figure 1). This habitat has historically been dominated by red and jack pine. In the absence of fire, succession will lead to a white pine-dominated system then, ultimately, to hardwoods.
- In mesic habitats, cedar may be experiencing impaired regeneration. The greatest densities of cedar were in the 12.5-25 cm size class, with lower density in the smaller size classes.
- Beech-maple is the climax forest type throughout most of the park. Beech is considerably more abundant than sugar maple, due largely to the avoidance of beech as a browse species by white-tailed deer.
- White-tailed deer density is high (22/mile² in Leelanau Co., mainland, and 29/mile² in Benzie Co.). This may be contributing to the depauperate understory at many plots (Figure 2).
- Beech bark disease will become a pressing issue within the next 20-30 years. Efforts to reduce the dominance of beech and promote maple growth and reproduction will lessen the potentially devastating impacts of this disease.

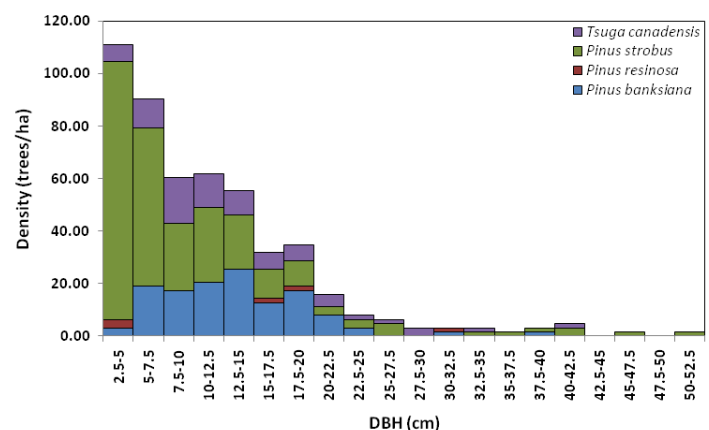


Figure 1. Density-diameter graph of softwoods in dry to dry mesic, poor to medium habitat.



Figure 2. Transect 2, plot 8038, showing depauperate understory.