



Seeing the Forest for the trees (and snags)

Results of Annual Forest Health Survey at Marsh-Billings-Rockefeller NHP

Background

Forests of the northeast have a long history of resiliency and recovery. Ice ages, weather events, large scale clearing, and introduction of pests and invasive species have all played significant roles in shaping the forest communities we have around us today.

Long-term health of the forests of Northeast Temperate Network (NETN) parks is a high-priority for the network. The goals of the forest monitoring program are to assess status and trends in the composition, structure the condition of forest systems in a way that effectively informs park managers and other stakeholders.

Purpose and Scope

To aid in reporting data in a clear and useful way, NETN developed the Ecological Integrity Scorecard, which interprets the condition of forested ecosystems by assessing a range of ecological components in relation to their natural or historical conditions.

Integrity is ranked in one of three categories: Good, Caution and Significant Concern. “Good” represents acceptable or expected conditions; “Caution” indicates

a problem may exist; and “Significant Concern” indicates undesired conditions that may need management action. It is important to note that “ecological integrity” may not be the primary goal of natural resource management at all network parks, particularly at historical parks and sites where cultural resource management may take precedence. However, being able to compare the condition of park resources to ecological integrity benchmarks is valuable because it provides a deeper understanding of park condition, as well as a consistent baseline for assessment of management goals.

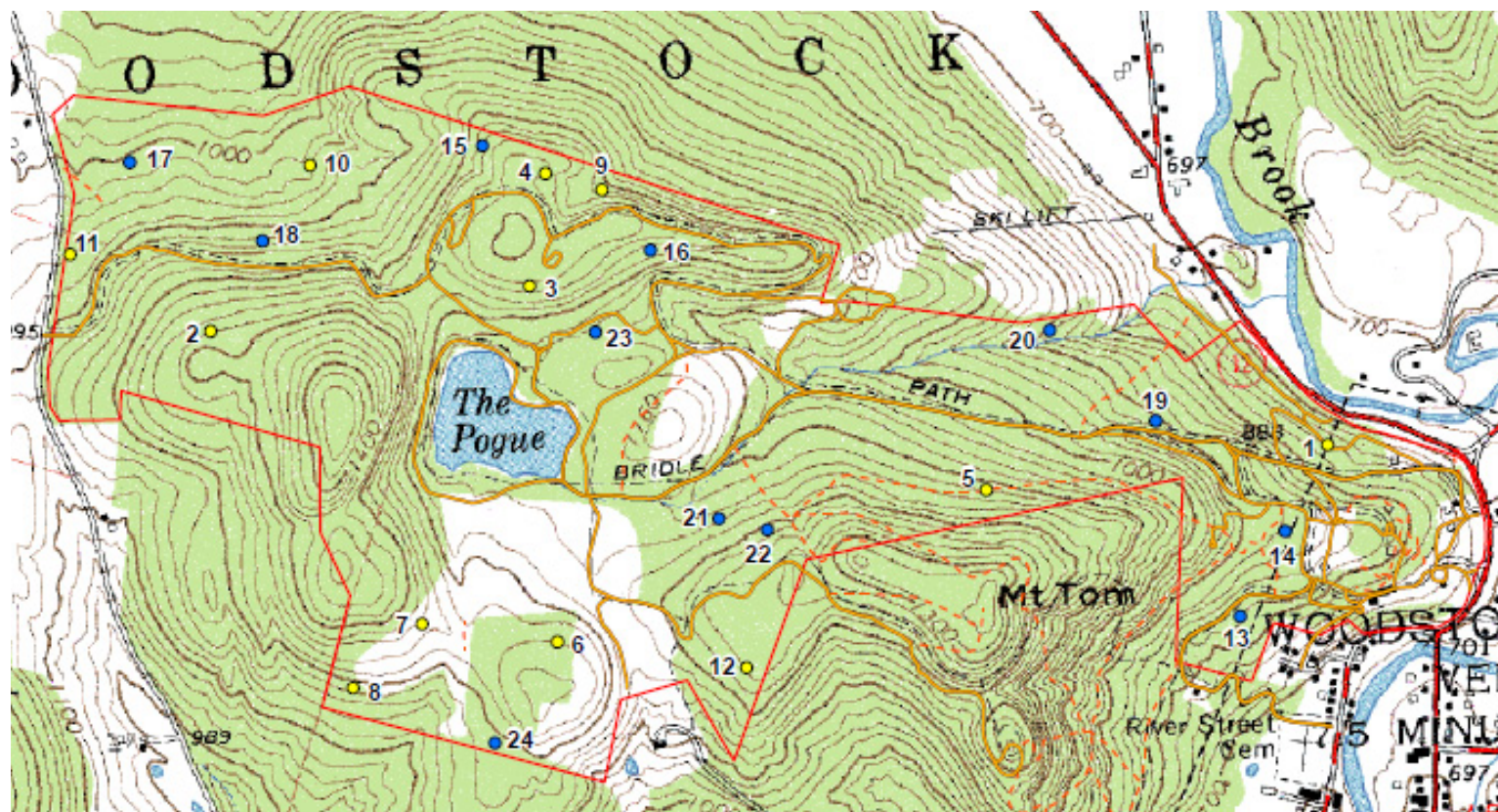
Results and Findings

The forest of Marsh-Billings-Rockefeller NHP is unique within the network because of the many historic tree plantations that it contains. Regeneration (i.e., seedlings and saplings) and tree diameter data were analyzed separately for plantations and natural forest stands because the different management strategies in these areas are likely to influence composition and density. Like most NETN parks, natural forest stands have many more small diameter trees than large, while plantations have a plateau or hump of mid-sized trees stuck between larger and smaller diameter trees. Both distributions are found under natural forest management, though the latter is also associated with disturbed conditions. The Structural Complexity Enhancement (SCE) management approach, which aims to promote late-successional characteristics in northern hardwood stands and allow more growing space to larger diameter trees, would be a useful guide for forest management in the park if not already in practice. Other SCE objectives that would benefit the managed forests include increasing the abundance of coarse woody debris and standing dead trees, adding vertical structure, and increasing variability of horizontal density.

Regeneration in natural forest stands is more diverse than in plantations, and closely resembles the composition of the forest canopy. In plantations, ash seedlings dominate the regeneration layer, and seedlings over 1 m in height are infrequent. Few of the non-native plantation species are present in the regeneration layer, indicating that naturalization rates are low. The exception may be Norway spruce, which is present in small amounts in the understory.



Soil sampling in one of the park's forest plots. NPS photo.



The numbered blue and yellow dots represent NETN forest monitoring plots in the park.



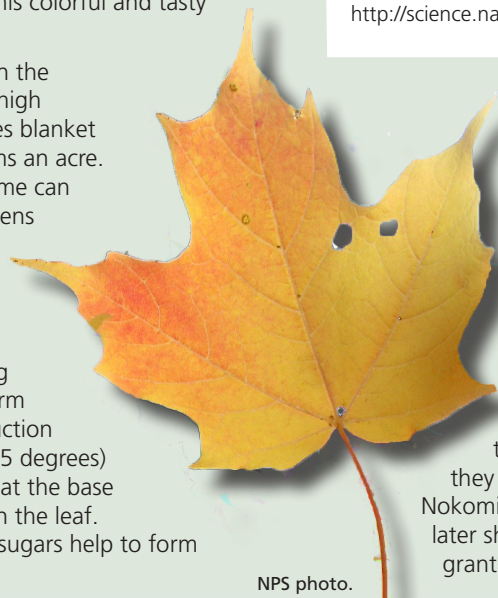
Species Spotlight: Sugar Maple

Few things evoke thoughts of New England as much as colorful fall foliage and sweet maple syrup. Sugar maples (*Acer saccharum*) are responsible in large part for the first and entirely for the second. And perhaps Vermont, where Marsh-Billings-Rockefeller is

located, is the state most associated with this colorful and tasty tree in the region.

A couple of keys to sugar maple's success in the northeast is prolific seed production and a high tolerance for shade. Saplings can sometimes blanket a forest floor numbering up to 60,000 stems an acre. Though most of the saplings will die off some can persist for 15-30 years and when a spot opens in the canopy, trees located directly below are perfectly poised to shoot up and occupy it, hogging 90% of the sunlight that hits its leaves.

Sunlight also plays a key role in determining how bright the tree's fall colors will be. Warm and sunny days in fall encourage the production of sugar in leaves. But cool nights (below 45 degrees) cause a waterproof abscission layer to form at the base of the leaf's stem, trapping the sugar within the leaf. Chlorophyll production is stopped and the sugars help to form



NPS photo.

the red pigment anthocyanin. As a rule of thumb, the more sun a leaf is exposed to, the brighter its colors will be, with the most vibrant often on the southern side of trees.

An Ojibwa legend tells the story of when a stand of bright colored sugar maples near a waterfall helped to hide Nokomia, grandmother of the fabled magician Nanaboujou, from a band of evil windigo spirits. Through the mist of the waterfall and the fiery reds of the maples, the windigos were convinced they were staring into a blaze in which Nokomia surely must have perished. Nanaboujou later showed the trees his appreciation by granting them with sweet, strong-flowing sap.

More Information

Brian Mitchell
NETN Program Manager

Phone/Email
802-457-3368 ext. 37
brian_mitchell@nps.gov

Kate Miller
NETN Plant Ecologist

207-288-8736
kathryn_miller@nps.gov

Full Report online at:

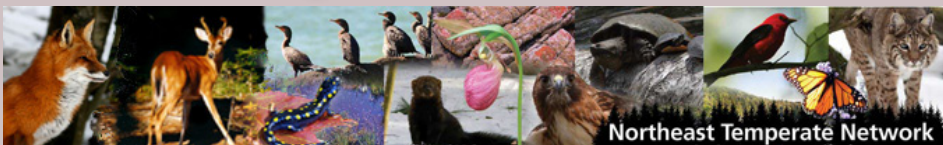
<http://science.nature.nps.gov/im/units/NETN/monitor/monitor.cfm>



Northeast Temperate Network

54 Elm Street, Woodstock, Vermont 05091
802-457-3368

<http://www.science.nature.nps.gov/im/units/netn/>



Northeast Temperate Network