



ACADIA NP • APPALACHIAN NST • BOSTON HARBOR ISLANDS NRA • MARSH-BILLINGS-ROCKEFELLER NHP • MINUTE MAN NHP
MORRISTOWN NHP • ROOSEVELT-VANDERBILT NHS • SAINT-GAUDENS NHS • SAUGUS IRON WORKS NHS • SARATOGA NHP • WEIR FARM NHS

Seeing the Forest for the Trees (and Snags)

Results of Annual Forest Health Survey at Acadia

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, and function of forested ecosystems, and to interpret and report the condition of forest systems in a way that effectively informs park managers and other stakeholders.

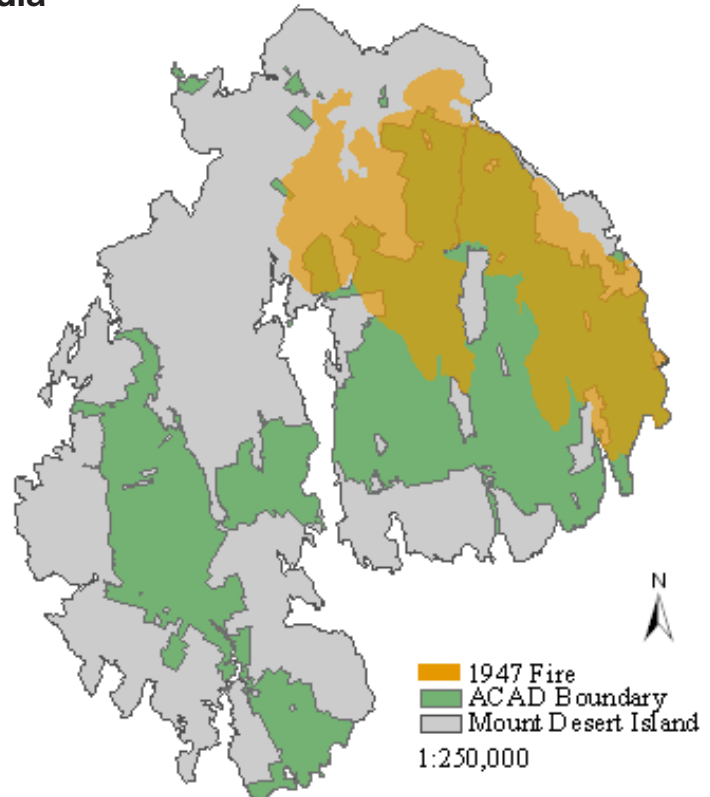
Purpose and Scope

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



Collecting data in one of Acadia's forest plots. NPS photo.



Mount Desert Island and the extent of the 1947 fire

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

Tree diameters in Acadia's forest plots are typical of second-growth forests in the region, with few trees of large diameter size classes and many trees in smaller size classes. Seedling densities were highest on the Schoodic Peninsula, though densities appear to be in good condition across all of the park.

Tree species that made up seedlings and saplings on Mount Desert Isle (MDI) are similar to that of the canopy. One interesting exception is the eastern portion of MDI within the boundary of the 1947 fire that burned over 8,600 acres of the park. Nearly half of the area burned was stand replacing (i.e., the disturbance wiped out most or all of the existing forest), and the typical early-successional species such as big tooth

aspen and paper and gray birches were the first to occupy the canopy post-fire. As is expected, these stands appear to be shifting to later successional forest species with white ash, northern red oak, red maple and striped maple occurring at higher seedling densities and with aspen and birch species being the most abundant standing dead trees in the burned area. This pattern is most evident in the Boreal Aspen-Birch Forest Ecological System, which only occurs in the park within the boundary of the 1947 fire. The seedling layer on Isle au Haut and on the Schoodic Peninsula are similar in that they are dominated by red spruce and black spruce.

Dead wood, in the form of standing dead trees (snags) and fallen coarse woody debris (CWD), is an important structural feature of forests that provides habitat for a wide variety of species. Logging and hazard tree removal can reduce the quantity or quality of these features, but strategic land management can maintain or enhance snags and CWD. Overall CWD levels at Acadia were rated as "Caution." However, when analyzing the data by subunit, the western section of MDI rated as "Good". Isle au Haut and eastern MDI fell into the "Caution" category. Schoodic Peninsula was not rated due to insufficient sample size.

Conclusions

Forest condition, composition and structure vary across the park, but in general species composition and structure are typical of second growth forests in the region. Structural stage distribution (the early, mid, and late stages of forest succession characterized by forest types falling within the broad age classes of young, mature, or old-growth), coarse woody debris and snag abundance ratings were lowest in the eastern section of MDI. The "Caution" and "Significant Concern" ratings on eastern MDI are all likely the result of the 1947 fire. Spruce (primarily red spruce) and balsam fir are replacing the birch and aspen dominated forests that originated after the fire on eastern MDI.

While it may appear that coarse woody debris and snags are abundant in Acadia's forests due to dying birch and aspen, these trees often do not meet the minimum size requirement to be included in NETN's calculations. Forests on Isle au Haut, Schoodic Peninsula, and western MDI are in the early stages of stand maturity, and it will be some time before they develop late-successional structure sufficient to receive a "Good" rating for structural stage distribution. As long as management efforts keep threats such as invasive plant species and forest pests at a minimum, conditions are expected to improve over time throughout the park.



Species Spotlight: Balsam Fir

Because of its enticing aroma and pleasing form, the balsam fir (*Abies balsamea*) is among the most popular Christmas trees sold every year. It gets its name from the ancient Hebrew word for aromatic tree resins used in creating balms and salves. They are

native to most of eastern and central Canada and the northeastern United States.

When attacked by a fungus the tree will up sap production, laying it on thick where the fungal strands are attempting to penetrate its soft wood. Native Americans and early lumberjacks would squeeze this resin, or "gum", from the tree and use it as an antiseptic seal for cuts and wounds. The tree's thick and resinous sap is also the key to its ability to survive the harsh winters of Acadia. The sap acts as a sugary natural antifreeze in the roots and branches and allows the tree to hold onto its dormant needles throughout the winter. When temps once again rise above freezing, the tree can immediately start photosynthesizing and take advantage of northern Maine's short growing season.

On subalpine slopes, firs can exhibit an interesting growth pattern known as a "fir wave". Trees that are most exposed to damaging winds and ice rime will eventually topple or die off and expose other smaller, younger firs behind them to the same stresses. The process

commonly moves in distinct waves across the slope with young saplings springing up after their elders demise until the next death wave reaches them usually 60 or 70 years later.



Robert Mohlenbrock photo

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