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Forest Monitoring Branches into Second Cycle

Results of 2010 Forest Health Survey at Saint-Gaudens

Background

Forests of the northeastern U.S. have a long history of change, 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.

Though still in the very early stages of a long-term monitoring program, the 2010 field season marked a milestone for NETN in that it was the first year that forest plots in several parks, including Saint-Gaudens, were resurveyed. 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.

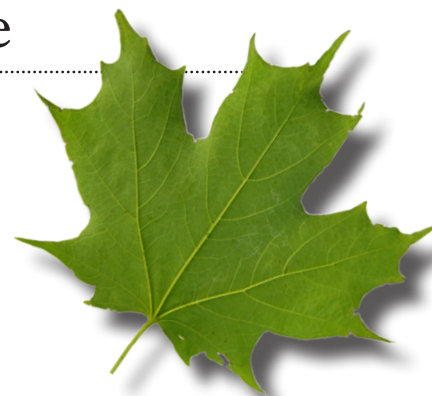
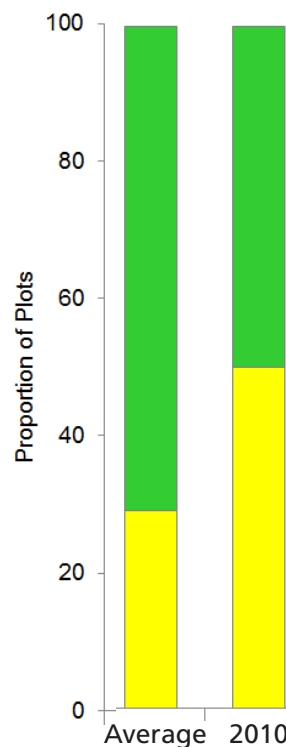
Purpose and Scope

One way the Network does this is through the use of an Ecological Integrity (EI) Scorecard to interpret the condition of forested ecosystems by assessing an array of ecological measurements and comparing them to their natural or historical range of variation. NETN recognizes that “ecological integrity” may not be the primary goal of park resource management, particularly at historical parks and historic sites where cultural resource management may take precedence. Even at these sites it is valuable to be able to compare the condition of park resources to benchmarks because it provides a deeper understanding of park condition, as well as a consistent baseline for assessment of management goals. The Network will work with parks individually to develop EI scorecards that track progress towards park management goals that differ from the benchmarks, in addition to reporting ecological integrity.

EI 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.

Results and Findings

Results for some selected forest health indicators at Saint-Gaudens NHS are presented here. For the complete report, visit NETN’s website.



Tree Condition

- Good
- Caution
- Sign. Conc.

Proportion of plots receiving “Good”, “Caution” and “Significant Concern” ratings for tree condition at Saint-Gaudens NHS in 2010. Average bars include 2008 & 2010 data.

Dead wood, in the form of standing dead trees (snags) and fallen coarse woody debris (CWD), is an important element of forests that provides habitat for many plants and animals. Density of snags and volume of CWD in mature and late-successional forest stands vary substantially across ecosystems and with site conditions. Positive relationships between live and dead tree density can be used to indicate expected snag levels, and positive relationships between live tree volume and volume of CWD can be used to indicate expected CWD levels. Saint-Gaudens rated “Caution” for both CWD and snag abundance (due to the low numbers of medium to large snags).

Tree regeneration assesses the quantity and composition of advance tree regeneration in the forest understory, which impacts future canopy structure and composition. Regeneration can be affected by a variety of factors, including invasive species, climate change, and sustained, selective browsing by a historically high population of white-tailed deer in parts of the northeast U.S. The 2010 report indicates that tree regeneration appears to be adequate in the park.

Overall tree condition in Saint-Gaudens appears to be healthy, with no plots receiving ‘Significant Concern’ ratings. Holes in leaves and chlorosis (yellowing of leaf tissue due to a lack of chlorophyll) of the foliage were the most common reported tree conditions, and other than beech bark disease, no priority pests or pathogens were detected in a plot during the 2010 field season. *NOTE: the*



Hemlock woolly adelgid has been detected not far from Saint-Gaudens borders in southern New Hampshire. Early detection will be vital to keep this pest under control.

published 2007-2010 forest health report contains a graph that erroneously flipped the “2010” and “average” representations in the bar graph. The bar graph as it should appear is included in this brief.

Invasive exotic species have the potential to impact the structure, composition, and function of forested ecosystems, and are one of the leading threats to biodiversity and ecological integrity of ecosystems worldwide. Early detection of invasive exotic plants is a NETN vital sign that has been incorporated into several long-term monitoring protocols. Status and trends of invasive species are monitored on NETN forest plots, and the Eastern Rivers and Mountains Network (ERMN) and NETN are implementing a separate protocol for early detection of invasive species and forest pests. Saint-Gaudens ranked “Caution” for indicator invasive exotic plant species in 2010, with an average of 0.65 indicator species per plot. The most prolific invasive was exotic bush honeysuckle (found in six out of 20 total park plots), followed closely by Japanese barberry (5/20).

NETN monitors soil chemistry to understand the effects of atmospheric deposition on the health of forest vegetation. Atmospheric deposition is a special concern for forests in the northeast on thin soils where soil buffering capacity is generally low. Atmospheric deposition alters forest soil chemistry by depleting soil nutrients and has dramatically increased inputs of nitrogen in soils of the northeast. Feedback from soil scientists has led NETN to realize that it needs to revise the way it measures and interprets soil chemistry to reflect the complexity of acid deposition and stress in forest soils. For what it’s worth, 2010 measurements showed that all parks but Acadia (“Good”) ranked “Significant Concern” for the Carbon-to-Nitrogen ratio, indicating that excess nitrogen may be an issue in Saint-Gaudens. Data indicated that soil acidification may be an issue in the park.

Saint-Gaudens rated “Good” for both forest patch size and neighborhood anthropogenic land use (ALU). Forest patch habitat consisted of two large patches, the largest of which started east of Saint-Gaudens Road, and continued nearly 2 km east and south to include most of Dingleton Hill. Considering that over 90% of area of both forest patches occurred outside of its boundaries, most of the park has a good buffer of natural habitat.

Roughly half of the plots in the park had over 10% neighborhood ALU (100 m buffer radius), but seven plots had no ALU. Neighborhood ALU was highest in plots located near the buildings and gardens in the park, and close to the northeastern border. Development to the east of the park may have the greatest potential to impact the condition of park forests and fauna dependent on interior forest habitat.

Conclusions

While invasive species are present in the park, they do not appear to be greatly impacting forest condition. Since 2003, the park has worked to remove an impressive 78,000+ individual invasive plants and management should continue its efforts to eradicate invasive species, especially exotic shrubs. Hemlock woolly adelgid may pose the greatest threat to forests and cultural landscapes in Saint-Gaudens NHS. Early detection efforts should focus on surveillance for the hemlock woolly adelgid in and around the park.

More Information

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Full Report online at:
<http://science.nature.nps.gov/im/units/NETN/index.cfm>



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