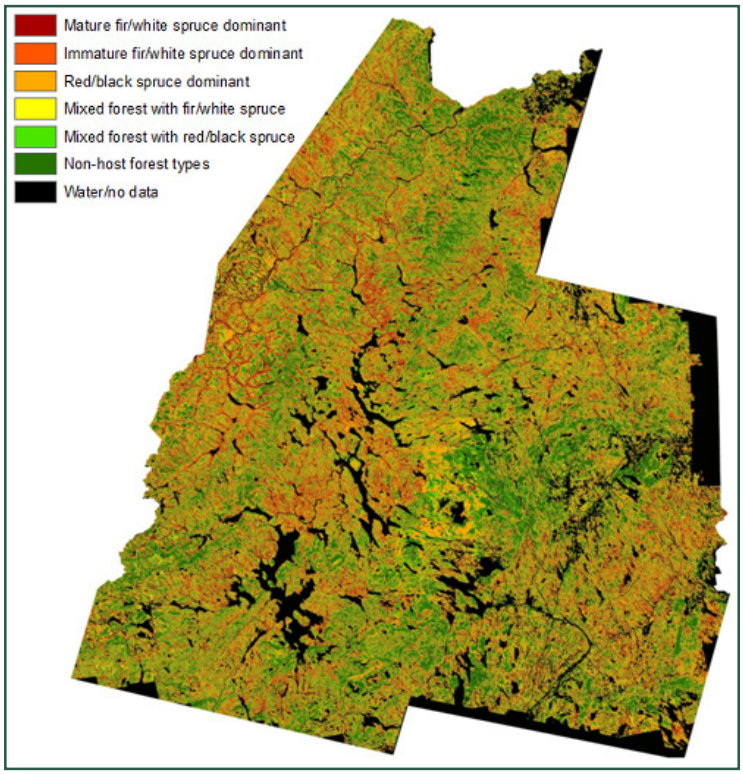
Project Impacts

NSRC-FUNDED RESEARCH FINAL REPORT

Impacts of Spruce Budworm and Forest Management on Future Wood Supply



Projected forest conditions ca. 2050 for 10-million-acre study area in northern Maine, grouped by relative vulnerability to spruce budworm defoliation

PROJECT AWARD YEAR AND TITLE:

2010

Evaluating the Interacting Effects of Forest Management Practices and Periodic Spruce Budworm Infestation on Broad-scale, Long-term Forest Productivity

PRINCIPAL INVESTIGATORS:

Kasey Legaard
kasey.legaard@maine.edu

Erin Simons-Legaard

Steve Sader
University of Maine

Jeremy Wilson
Harris Center for Conservation Education, NH

COLLABORATORS:

Andrew Lister

Brian Sturtevant
USDA Forest Service Northern Research Station

Dave Struble
Maine Forest Service

Repeated eastern spruce budworm infestations have profoundly influenced Maine's spruce-fir forest. This native insect has historically infested the Northern Forest every 30 to 50 years, causing widespread defoliation, growth reduction, and mortality of balsam fir and spruce trees. The last outbreak occurred 1972-1986 and motivated extensive salvage harvests, typically commercial clearcuts. As Maine anticipates the next outbreak, regenerating forest in previously salvaged areas is still young and less vulnerable than in the 1970s. However, greater than 2 million acres consist of vulnerable poletimber and sawtimber.

Developing methods to anticipate and address the challenges presented by large-scale outbreaks coupled with changing forest conditions, management practices, and public policy is critical. NSRC researchers used a forest landscape model, LANDIS-II (LANDscape Disturbance and Succession), to simulate different forest management and budworm outbreak scenarios across a 10-million-acre study area in northern Maine. Scenario outcomes were analyzed to improve understanding of how harvesting, budworm mortality, and salvage logging interact and influence wood supply, forest composition, and vulnerability to subsequent outbreaks.

Their 100-year projections show that many areas in northern Maine that did not support balsam fir and spruce in 2010 may transition to more mixed composition with a significant spruce-fir component by 2050, substantially increasing the area at risk of subsequent outbreaks. During an outbreak, the combination of budworm-induced mortality and salvage harvesting will cause a rapid decline in spruce-fir biomass, followed by gradual recovery. Spruce-fir dominant forest will persist in many areas, but harvest-budworm interactions may lead to broad-scale changes in forest type distributions.

Funding support for this project was provided by the Northeastern States Research Cooperative (NSRC), a partnership of Northern Forest states (New Hampshire, Vermont, Maine, and New York), in coordination with the USDA Forest Service, an equal opportunity provider.