Project Impacts

NSRC-FUNDED RESEARCH FINAL REPORT

Bioenergy Fuel Harvesting Impacts on Forest Habitat and Carbon Emissions

PROJECT AWARD YEAR AND TITLE:
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Biomass Fuel Harvesting in the Northern Forest: Effects on Stand Structural Complexity and In Situ Forest Carbon Storage

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Demand for forest bioenergy fuel (firewood, wood chips, pellets) increases in the Northern Forest region, but ecological impacts—particularly on wildlife habitat—of bioenergy harvesting remain poorly explored. There is also uncertainty over greenhouse gas (carbon) emissions associated with wood bioenergy production. NSRC researchers studied effects of bioenergy harvesting on habitat and carbon emissions for 35 recent harvests in northern hardwood–conifer forests in northern New York, Vermont, and New Hampshire. They compared three types of harvest treatment (bioenergy harvest with and without whole tree harvest and non-bioenergy harvest) with unharvested areas.

Researchers found harvesting impacts were highly variable across sites, and harvesting treatment and equipment best predicted effects on forest structure and habitat. Findings support need for harvesting guidelines aimed at retention of ecologically important wildlife attributes, such as logs or standing dead trees. Bioenergy harvests using whole tree harvesting generated fewer wood products and resulted in more carbon emissions released from bioenergy than the other two types of harvests, which resulted in greater net transfer of carbon to debris left on site or to forest products. Type of skidding machinery and specifics of treatment had the largest impact on net carbon emissions.

Impacts of intensified bioenergy harvests and subsequent carbon emissions could be reduced if operators select smaller equipment and leave tree tops on site. To reduce carbon emissions, researchers recommend establishing forest reserves to offset emissions from more intensively managed areas. Choice of wood energy end use is also important, since smaller scale, efficient thermal applications minimize emissions compared to larger scale, less efficient electricity production.

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