

Enhancing Forest Biodiversity, Regeneration, and Ecosystem Health in a Changing Climate

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The Need

In northern forests, leftover treetops and branches from timber harvest are often used by industry for pellets, mulch and pulp, by small-scale commercial firewood operations and by wood-burning households. Collection of the leftover wood, usually after a harvest, is seen as an efficient use of labor and a value add to the operation. However, woody material left in place can greatly influence forest floor environmental conditions and improve forest health. With predicted changes in climate, including extreme heat and droughts, excessive removal of wood from the forests could threaten future productivity, increase vulnerability to disease and result in a loss of vital ecosystem services. With forests claiming 63% of New York's landscape — the majority being small family forests of 100 acres or less — practical solutions that meet economic needs while preserving forest health could prove vital for the state and scale to serve forests all over the world.

The Approach

This project sought to develop a win for forest ecosystems and the timber industry by developing practical methods for timber harvesting that helped keep the forests healthy and thriving. Specifically, the project team tested a simple solution in five separate forest stands across Central New York: placement of loosely consolidated piles of treetops and branches — parts of the tree that aren't used in commercial lumber — on the forest floor. During a timber harvest, the decision of how much wood to remove and the best manner to retain it has long-term implications for sustained forest health, ecology and economics. After a canopy thinning, bare and exposed ground creates poor conditions for regeneration and is slow to recover. This project aimed to measure the impacts of constructed piles on forest regeneration and key environmental and biological factors across 10 years. Additionally, soil in the experimental forest stands was analyzed and compared to three un-managed forests, including two that were old growth. The goal of the work was to provide guidelines to forestland owners to encourage straightforward activities that promote regeneration and sustain healthy forests in a changing climate.

The Impacts

By leaving behind some of the timber harvest, this project demonstrated that woody materials on the ground can buffer temperature extremes, retain moisture during droughts and benefit many forest animals and plants in the process. Short-term impacts included more stable ground temperatures, more continuous moisture near the ground and in the soil, shielding from effects of harsh sun exposure and more cover for plants and animals. Findings from this program have been shared in presentations to more than 850 people across New York state and Pennsylvania and integrated into educational and extension programming, including the popular NY Master Naturalist program, which has trained more than 450 volunteers about issues such as forest health and biodiversity. Applied at a larger scale, these straightforward methods can create an overall buffer effect, minimizing microclimate extremes and mediating the effects of an increasingly erratic climate — something that all northern forests can benefit from.