

Welcome to the Woods!

Meeting the Needs of Our Changing Northern Forest Population Through Affordable Housing Developments that Incorporate Regionally Sourced, Climate-Smart Wood Products

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By Anthea Lavallee on behalf of the [Emerging Climate Leaders Collaborative](#) and the [Hubbard Brook Research Foundation](#) and in partnership with the co-authors and collaborators listed below

The Triple Threat

1. Climate Change

The science of climate change is unassailable. The impacts across the [Northern Forest](#) have been documented through routine, rigorous long-term scientific measurements. Based on more than 50 years of continuous ecosystem monitoring at the [Hubbard Brook Experimental Forest](#), we know that:

- The air is warming. Average annual air temperature has increased by 2.6°F over the study period, and winter is the fastest-warming season.
- We are getting more and heavier precipitation. Annual precipitation has increased by 13 inches, and more is falling in heavy bursts. We have 7.5 more days per year with heavy rainfall (i.e., $\frac{3}{4}$ of an inch or more in a day), and rain-on-snow events are more frequent.
- Stream flows are higher and increasingly variable.
- We have fewer cold days. There are 10 fewer days per year when the maximum air temperature is below 32°F.
- Snowpack is decreasing. Average annual snow depth has decreased by 11 inches. Duration of snowpack has decreased by 24 days per year.
- Lake ice is disappearing, with 25 fewer days per year of lake-ice cover.

Climate change is affecting our economy and culture. For example, we are losing snowmaking opportunities, particularly in the early ski season. In the White Mountains of NH, eight days of snowmaking opportunity have been lost over the last 50 years. Seven of these days occur before the holidays, representing a 20% reduction in snowmaking conditions during the early ski season, a crucial period in a winter recreation economy. Small ski operations without large-scale snowmaking infrastructure have disappeared. Those that make snow must use more water over shorter periods to establish and maintain snowpack. This requires additional investments in equipment and access to substantial water reserves.

Other quintessential Northern Forest economies are in jeopardy. Snowmobiling associations are struggling with the loss of snowpack and lake ice. There are fewer opportunities for timber harvesting on snowpack to protect against soil disturbance and erosion. Without insulating snowpack, maple tree roots are damaged by more frequent soil freezing. This has a negative effect on forest growth and may lead to lower maple yield and shorter sugaring seasons.

Human health is also at risk. Intense weather and rain-on-snow events cause high runoff. This increases the incidence of flooding and contributes to the pollution of downstream water supplies. As winters warm, some ticks, mosquitos, and invasive insect pests are no longer suppressed by cold temperatures. If ticks and mosquitoes expand their ranges and become more abundant, human communities will be at increased risk of Lyme disease, eastern equine encephalitis, and other illnesses.

2. Inadequate Housing for a Growing Population

Our Northern Forest population is changing. Through the pandemic, when high density city living became less safe, we experienced a rush of people seeking the fresh air, open space, and aesthetic beauty of our less developed landscape. Urban day-trippers turned into seasonal renters. Many have become our permanent neighbors. COVID migration is a preview of the climate and refugee migration already underway, as people retreat from the front lines of political conflict around the world and climate hot spots across the U.S.

According to the U.S. Census Bureau, in 2020 and 2021, [Vermont experienced an influx](#) of nearly 5,000 new residents. Small town populations boomed, and schools were reopened to accommodate sky-rocketing new student enrollments. At the same time, Maine and New Hampshire each gained approximately 15,000 new residents. Homeownership shifted rapidly, when longtime residents sold in a market surge, making way for newcomers with the flexibility to work remotely. This sudden demographic flux reversed a trend across many Northern Forest villages and towns that had been in population-decline for years.

We simultaneously face a housing supply crisis. According to [Fannie Mae](#), the pre-pandemic shortage in the U.S. was estimated at 3.8 million units. Starting from a baseline housing deficit, broken supply chains and historic workforce shortages hindered COVID-era construction. According to the [National Low Income Housing Coalition](#), Maine, New Hampshire, and Vermont are confronting an average shortfall of 18,200 affordable rental units, and modest-priced homes are disappearing, making ownership increasingly unaffordable for average families.

3. A Forest Products Industry in Decline

Over the past several decades, our regional forest products sector has suffered a cascade of destabilizing blows, beginning with a declining market for low-grade wood products, including paper and pulp. The resulting layoffs and mill closures left once-vibrant rural communities in the tightening grip of economic depression, chronic unemployment, and addiction.

The Triple Win

We now have a special opportunity to address these challenges simultaneously. At this moment in U.S. history, there is an unusual alignment of solutions-based science, environmental awareness, political will, public and private funding, and a shift toward corporate sustainability and consumer responsibility. Together, at the intersection of science, housing development, and forest products, we can achieve a triple win to combat climate change, meet the needs of our growing population, and rebuild our forest-based economy.

By working across sectors and disciplines, we intend to:

- Deploy scientific research to support forest management practices that enhance carbon sequestration on the land as a natural solution to climate change.
- Reinvigorate our region's forest products economy by building new markets and capacity around

climate-smart wood. This will include new infrastructure for converting low-grade wood into high-quality construction materials.

- Catalyze a skilled, high-tech workforce for managing forests using the latest technology, data science, and satellite images. New forest employment opportunities will span the following sectors: forest products, technology/innovation, and corporate sustainability.
- Incentivize housing developments that incorporate regionally sourced, climate-smart wood products. The focus will be on wood harvested according to carbon forestry practices to protect carbon stocks, enhance healthy forest regeneration, and amplify landscape-scale carbon sequestration. Harvested wood will continue to store carbon over its usable lifespan as a durable, long-lasting, high-performing construction material.
- Mobilize financing from impact investors, institutional partners, and public sources (e.g., the IRA, Infrastructure Bill, and the 2023 Farm Bill).

Sensing this special opportunity, on May 2, 2022, the Emerging Climate Leaders Collaborative hosted a [virtual youth forum](#) at the intersection of climate, forests, and housing. Building on the success of this initial event, we convened an expanded group of thought leaders on October 17, 2022 with expertise in carbon forestry, forest management and conservation, forest products, housing development, clean energy, and public policy ([summary](#)). We reconvened with additional partners on February 2, 2023 to review progress, explore questions and ideas, and map out next steps.

Based on these action-oriented dialogues, we are building momentum and have identified a range of objectives, as we move from abstract concepts to practical applications, including:

- Public programs designed to incentivize buying regionally sourced, climate-smart wood products (e.g., rebates)
- Low-income tax credits for affordable housing developments that incorporate regionally sourced, climate-smart wood (i.e., Qualified Allocation Plans via State Housing Authorities)
- Regional corporate partners with a commitment to corporate responsibility and a willingness to test procurement strategies based on regionally sourced, climate-smart wood
- Investments in new infrastructure and technology for processing traditional wood materials, cross-laminated timber, wood fiber insulation, etc.
- Consumer and industry awareness campaigns highlighting the value of forest management for a healthy balance of ecosystem services, including carbon, wildlife/habitat, clean air/water, recreation, etc. Restore the “social license” to practice forestry
- Creative workforce development. For example, Ukrainian refugees are migrating to our region from a well-established forest sector. Incentivized certification, training, and employment opportunities would enable political refugees to quickly access living wages as part of a skilled “New American Forest Workforce.”

If we are successful, our region will lead the nation by blending our rugged, rural, forest-based values with cutting-edge science and technology to achieve a triple-win for climate, affordable housing, and our forest products economy.

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