

Catastrophic Results of Colonial Clearcutting: The Evidence Below Your Feet  
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New England is a unique natural laboratory where we can use geologic evidence to evaluate the long-term response of the landscape to historical clearcutting and subsequent reforestation. Geologic records provide a window through which to view the future effects of current clearcutting and to plan rationally timber harvesting not only in the northeastern United States but in other areas such as the Pacific Northwest.

Two hundred years ago, New England forests were falling before waves of settlers. Land was cleared for timber, for intensive agriculture, and to provide pastures for grazing. In northern Vermont, where we have conducted our research, land clearance began in the late 1700s. Within a few decades, the trees had been stripped from valley bottoms to make way for farms. Within less than 100 years, timber harvesting had cleared most trees from all elevations including steep slopes of the 4000-foot Appalachian Mountains. By 1880, over 90% of today's forested Vermont landscape was grassland.

A variety of geologic archives demonstrate that settlement and clearcutting massively impacted the Vermont landscape. Small alluvial fans, deposited at the base of steep hillslopes, preserve a detailed and datable record of sediment deposition from which we have estimated rates of hillslope erosion over the past 8,000 years. In the five fans excavated so far, the pre-settlement, organic-rich soil horizon is well preserved, buried by 0.5 to 4 meters of historic sediment. A similar thickness of historic sediment buried floodplains of the region's major rivers. As waves of sediment moved down stream, historical maps indicate that river deltas expanded. There is clear evidence that material eroded from deforested hillslopes buried fertile valley bottom soils with thick layers of sand and gravel, preventing cropping of some land and likely diminishing crop yields on others.

Our data show that colonial land clearance and agricultural practices increased rates of hillslope erosion 5 to 10 times over background rates. Future, large scale land clearance in New England or other climatically and geologically similar areas would likely generate the same, dramatic, landscape response.