

POST-GLACIAL LANDSCAPE CHANGE IN NORTHERN VERMONT: EROSION
AND SEDIMENTATION IN THE WINOOSKI BASIN
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The rate at which New England landscapes have changed through the Holocene and the specific impact of colonial deforestation on this rate are not known. We are using historical sources and extensive trenching to constrain rates of landscape change in the 2900 km² Winooksi River basin. Our initial findings suggest that debris fans preserve a record of hillslope denudation stretching back over 7000 years, that growth of the Winooksi delta in Lake Champlain in response to colonial deforestation was rapid, and that a significant volume of historic sediment is stored in the main stem Winooksi flood plain.

Debris fans, fed by ephemeral drainages and present where steep hillslopes abut inactive terraces of Winooksi tributaries, appear to preserve a history of hillslope denudation. These fans are relatively common (12 fans in the 192 km² Huntington River sub-basin) but small (10³-10⁴ m³). Several excavations in a fan near Huntington, VT reveal sequences of poorly sorted gravel, sand and silt which we interpret as individually debris- and stream-flow rich horizons (1-4 cm) cross-cut depositional units; we interpret these as paleosols perhaps augmented by charcoal. Below these organic horizons (2.2m below fan surface) is a wood-rich gravel unit from which a sample (4x13 cm, 30-40 rings) gave an uncorrected radiocarbon date of 7360±95 (GX-20058). This date and the fan sediments over-and underlying it imply that deposition on the fan is neither entirely historic nor the result only of erosion immediately following deglaciation.

Two lines of evidence suggest that rates of sedimentation (and presumably hillslope erosion) increased after settlement and clear-cutting. 1.) Maps show a pronounced increase in the extent of the Winooksi River delta occurring 50-75 years after the most intense period of land clearance. 2.) Trench sets (n=7) on the Winooksi River flood plain contain an average of 0.95±0.80 m of historic alluvium. Although the volume of historic sediment delivered to and removed from the Winooksi delta is unknown, the volume of historic alluvium (0.02-0.04 km³) stored in the flood plain could alone account for an average of several cm of hillslope lowering during and after the colonial period.