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140 years of river aggradation and incision following Euro-American settlement

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The Whitewater River and its tributaries, located in southeastern Minnesota, USA, received intensive geomorphic study starting in 1939. By this point, up to 4.5 meters of sediment buried the prior channel and floodplain. The culprit was agricultural intensification starting with Euro-American settlement around the year 1855. By converting forest and deep-rooted prairie into row crops and grazing land, these settler–farmers set the stage for gullying, erosion, and eventual infilling of the valley floor. Nearly 2000 probes down to the pre-settlement soil provide a ca. 1855 floodplain surface along 94 transect lines. Topographic surveys in 1939, 1965, and 1994 extend this record to about 140 years and the number of total transects to 107. We digitized primary historical sources, many of which existed only as paper records, and built a geospatially registered data set of valley-bottom topography. This data set reveals migrating waves of erosion and deposition over time scales long enough to observe how Earth's surface responds to human disturbance and shape our thinking about river dynamics in fluvial geomorphology.