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Effect of flood regime on tree growth in the floodplain and surrounding uplands of the Wisconsin River.

Tree growth is influenced by flood regime and flood tolerance in riverine landscapes. We studied tree growth in floodplain and upland forests of the Wisconsin River. The floodplain is bisected by a levee that confines overbank flooding. We addressed three questions: (1) How do tree growth rates differ between floodplain forest stands and upland forest stands? (2) How do tree growth rates in floodplain forest stands differ with flood regime? (3) How do growth rates of flood-tolerant and flood-intolerant tree species in the floodplain differ with flood regime? Annual tree growth rates from 1991-2000 were determined from tree increment cores for individual species and stands. Stand-level tree growth in the floodplain was significantly higher than in the uplands, but growth in floodplain sites did not differ across the levee. Tree growth rates varied among species. The most flood-tolerant species grew faster on floodplain sites inside the levee, while growth of less flood-tolerant species did not differ with flood regime but varied with microtopography and distance from the river. Greater annual flow increased growth in floodplain stands and in less flood-tolerant species. These results suggest that flooding positively influences stand and species-level tree growth.