

## Urban Stream Corridors and Forest Patches – The Connections: A Case Study of Bloomington, IN

### Abstract

Urban forest patches (UFPs) are frequently found near stream corridors. They provide buffers for floods and offset physical and chemical effects of urban stream syndrome. This well-studied phenomenon describes how stream channels in urban environments develop modified channel morphologies and often carry increased concentrations of nutrients and contaminants. This is due primarily to high amounts of impervious surface cover, industrial discharges, and daily human activities. In the City of Bloomington, both UFPs and streams changed as the city expanded and developed. In this study, we looked at UFPs and streams in two sections that are currently within Bloomington city boundaries using GIS aerial imagery from 1939 and 1967 as well as 2016 NLCD tree canopy cover data. One site covers the College Mall area. This site includes Latimer woods, a designated nature preserve, and Jackson Creek. The second site includes a section of downtown west of Indiana University, which contains Clear Creek and Campus River. Over time UFPs have changed in size, number, and location. UFPs in the downtown area shifted west due to increased development near Indiana University and the construction of forested bike trails west of downtown. College Mall forest patches became smaller but more numerous due to a mixture of fragmentation of established forests patches and new UFPs growing in cleared unused spaces. Stream corridors in both sections became less connected to surrounding patches as the city buried most channels to serve as stormwater drainage. Aerial imagery shows that most of the currently buried streams were buried between 1939 and 1967. This transformation of stream channels into stormwater corridors has reduced UFPs' ability to buffer flooding and likely increased the sediment and chemical runoff moving through these corridors.