

AN OVERVIEW OF STREAM ECOLOGICAL RESPONSES TO URBAN EFFECTS AND MANAGEMENT PRACTICES IN NEW ENGLAND

Nathan J. Smucker, Naomi E. Detenbeck, and Alisa C. Morrison

U.S. Environmental Protection Agency, Atlantic Ecology Division, Narragansett, RI, USA

Many recent studies have found large changes in ecological conditions related to small increases in watershed development. Future development and restoration practices will benefit from better documenting the effectiveness of management practices. We present (1) a brief summary of stream ecological responses to watershed development in New England, (2) an inventory of green infrastructure (GI) and low impact development (LID) in New England, and (3) a synthesis of peer-reviewed studies documenting downstream ecological responses to development and management practices beyond New England. The inventory includes 589 projects, of which 204 focused on vegetated retention and infiltration (e.g., rain gardens, wetlands), 158 on enhanced infiltration (e.g., pervious pavement, trenches), and 84 used rain barrels or green roofs. The remaining projects had other goals or used a combination of approaches. We examined 797 papers, of which 58 met criteria for analysis and compared 92 ecological responses (structural, functional, habitat) among degraded, restored, and reference streams (watershed-based approaches, not instream restoration). We also present an ongoing study of 12 watersheds representing gradients of impervious cover and GI or LID in New England.