

The U.S. EPA is evaluating the effectiveness of green infrastructure (GI) stormwater best management practices (BMPs) on stream habitat at the small watershed (\leq HUC12) scale in New England. Predictive models for thermal regime and substrate characteristics (substrate size, % embeddedness, % bank erosion) are being developed using historic monitoring data from State and Federal agencies for 1985 – 2010. A regional database has been developed which contains temperature time series from more than 1500 stations. Thermal regime models are being developed that incorporate flow-weighted spatial autocorrelation based on stream network distances rather than Euclidean distances. Input variables include watershed area, drainage density, elevation, channel slope, percent coarse surficial deposits in watersheds (as an indicator of potential groundwater input), baseflow index, air temperature, a solar radiation proxy (function of average solar radiation, riparian vegetation type/density, stream width), percent impervious area, and estimated stream flow. Stream bank erosion is modeled as a function of watershed characteristics, including % forest, watershed storage (lake + wetland area), and percent impervious area. Stream substrate embeddedness is being evaluated by considering both supply and transport capacity with comparison of expected travel time for bedload in gravel/cobble versus fine sediment fractions. Stream habitat condition in watersheds with GI stormwater BMPs will be compared with modeled predicted condition for watersheds with similar controlling factors including percent impervious area but no GI BMPs.