Application of Hydrologic Metrics to Quantify Stream Health in Small-Scale Urban Environment

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Abstract. Numerous studies have been conducted to assess the impacts of urbanization on stream geomorphology and ecology. Recent research has shown benthic macroinvertebrates to be good indicators of stream health. Furthermore, significant correlations have been shown to exist between these benthic indicators and certain hydrologic metrics in receiving streams. These studies have used stream gage data and/or computer models to study such relationships but the scale of the watersheds has been large; typically greater than two square miles. This study examines the application of such research to a small-scale urban environment in Fort Collins, Colorado. The study uses benthic data collected approximately 10 years ago and stream flow measurements from the City's flood early warning system. These data provide an opportunity to determine if the findings in other research can be applied to relatively small urban streams. Such trends could help guide development and stream rehabilitation efforts in the City to minimize future impacts of urbanization on these streams and provide guidance in prioritizing stream reaches for rehabilitation. However, the use of such small scale real data in an ever-changing urban environment makes the application of hypothetical trends more difficult. Stream alteration, data limitations, and annual runoff variations present additional challenges for developing relationships between stream health and hydrology that are seen to exist in larger watersheds.