

Ecological Health Assessments of Urban Streams Using a Multimetric Fish Model as a New Ecological Monitoring Methodology for Aquatic Ecosystem Network Establishments

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The objective of this study was to analyze some impacts of urban streams using physical, chemical and biological approaches. Three lotic ecosystems including four sites in Daejeon Stream, five sites in Kap Stream and two sites in Keum River were surveyed during 2002 - 2004. Ecological stream health model, based on index of biological integrity using fish assemblage (IBIF), was developed for assessments of the regional aquatic ecosystems and then applied to the three urban streams. Six metric attributes of original 11 metrics, suggested by Karr (1981), were modified for a development of the model. Overall, ecological stream health, based on the IBIF values, was judged as "fair poor" (32, n = 4), "fair" (38, n = 5), "and "good" (46, n = 2) conditions in the Daejeon Stream, Kap Stream, and Keum River, according to the modified criteria of U.S. EPA (1993). The model values, varied largely depending on the location of the point sources and physical habitat quality. Some locations impaired in terms of the stream health were identified by the IBIF approach and also key stressors affecting the health was presumed using conventional water quality measurements and physical habitat evaluation. This new methodology would be used as a key tool for ecological restorations and species conservations in the degraded aquatic ecosystems and applied for elucidating major causes of ecological disturbances. Ultimately, this approach provides us an effective management strategy of stream ecosystems through the establishments of

ecological networks in various watersheds. This work was supported by Grant No. R08-2003-000-10535-0-2004 from the Basic Research Program of the Korea Science & Engineering Foundation.

Key words: Multimetric model, ecological monitoring, stream health, stream management