

Ecological Monitoring Methodology Using a Fish Assemblage and Ecological Health Assessments

Kwang-Guk An

School of Biosciences & Biotechnology, Chungnam National University

New biological monitoring methodology in Korean government is developing for extensive evaluations and diagnosis of current ecological health of nationwide stream and river watersheds. The objective of this research was to develop biological multi-metric models using natural fish assemblages and apply the model to real lotic ecosystems for the model tests. The approach was based on the biological integrity, qualitative habitat evaluation, and the ecological laboratory tests. Ten metric systems were adopted for the index of biological integrity model using natural fish assemblages. Five metric attributes of original 12 metrics were modified for a development of the model and the metric numbers and attributes were determined using various references of multimetric models worldwide. So, the metric numbers and their attributes were partially changed for the regional applications along with the scoring criteria. Trophic guilds, ecological indicator species, and habitat guilds, analyzed from the laboratory and field approaches, showed a spatial variations depending on the locations of streams and point-sources and the physical microhabitat habitat conditions. Mean metric values, based on the calculations of ten metric models, reflected conventional water quality characteristics of nutrient regime, and agreed with results of static laboratory tests. Results showed that some impaired sites, in terms of ecological stream health, were identified in this study, and also major key stressors affecting the stream health were identified by additional qualitative habitat evaluation index. The present multimetric bioassessment methodology applied in this study may be used as a key tool to set up specific goals for stream restoration plans and identify recovery levels of lotic ecosystems after the restoration (i.e., prevention of point-source input, restoration of physical habitats, construction of riparian vegetation) as well as diagnosis of the current stream health conditions.