

# **EVALUATING TEMPORAL CHANGES IN AQUATIC MACROINVERTEBRATE AND STREAM FISH ASSEMBLAGES AT LONG-TERM MONITORING SITES IN THE SOUTHEASTERN US**

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The southeastern United States has undergone large scale historic land use change as a result of agriculture and urbanization. The USGS investigated temporal changes in aquatic macroinvertebrate and stream fish assemblages at long-term monitoring sites that were established to determine the status and trends of stream conditions in the United States based on specific indicators of current land use. This study assessed trends in the macroinvertebrate and fish assemblages of stream segments of four urban, six agricultural, and two minimally-altered watersheds as well as at two large river sites with integrated multiple land uses. The time periods of data collection varied across the sites beginning in 1993 and ending in 2008. All locations had a minimum of five years and a maximum of nine years of annual ecological community composition. A multivariate seriation test on the ecological time series for each site was used to identify significant trends in the macroinvertebrate and fish communities. The time series was then compared to assemblage metrics to determine potential structural and functional attributes of the changing communities. The responding metrics were then linked to indicators of water chemistry, hydrology, climatic factors, or stream habitat. Significant temporal changes in macroinvertebrate and fish assemblages were found at four and five of the thirteen sites, respectively. Two of these sites showed temporal change in both assemblages. Macroinvertebrate and stream fish metrics were found to be sensitive to changes in stream chemistry, stream habitat, and to a lesser extent, hydrologic indices. Progressive change in biotic assemblage structure can be identified in these locations highlighting the potential benefit of long-term biomonitoring and trends assessment to evaluate the effectiveness of land management activities.

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