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Integrating intermittent streams into watershed assessments: Applicability of an index of biotic integrity

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ABSTRACT

Nonperennial streams are often excluded from biomonitoring programs because of inadequate knowledge about their biological and hydrological characteristics and variability, but applying bioassessment indices to nonperennial streams would greatly expand the reach of these programs. To determine if a benthic macroinvertebrate assessment index (the Southern California Index of Biotic Integrity; IBI) developed for perennial streams could work in nonperennial streams, 12 nonperennial streams (3 of which were minimally stressed) in the San Diego hydrologic region were sampled multiple times. For comparison, three low-stress perennial streams were also sampled. Continuous water-level loggers and repeat site visits revealed that hydrologic regimes varied considerably among streams, with gradual drying evident at some and multiple drying/rewetting events evident at others; in addition, streams that were nonperennial one year were perennial in another. IBI scores from low-stress nonperennial streams were similar to those for low-stress perennial streams, and false indications of impairment (i.e., low IBI scores) were never observed. Furthermore, IBI scores declined as stress increased, suggesting that the IBI responds as expected in nonperennial streams. IBI scores were stable at most sites both within and between years, but midsummer declines were observed at high-stress sites. These declines were associated with declines in discharge, fast water habitat, and increases in sands and fines and macroalgae cover. These findings suggest that an assessment tool developed for perennial streams can accurately assess condition at certain nonperennial streams, and that biomonitoring programs can provide more comprehensive watershed assessments by including nonperennial streams in their surveys.

Full Text

http://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2013AnnualReport/ar13_357_375.pdf