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

Raphael D.Mazor[1],Eric D.Stein[1],Peter R.Ode[2],and Ken Schiff[1]

[1] Southern California Coastal Water Research Project, Costa Mesa, California USA
[2]Aquatic Bioassessment Laboratory, California Department of Fish and Wildlife, Rancho Cordova, California USA

ABSTRACT

Nonperennial streams are often excluded from biomonitoring programs because of inadequate knowledge about their biological and hydrological characteristics and variability. The ability to apply bioassessment indices to nonperennial streams would greatly expand the reach of biomonitoring programs. We sampled 12 nonperennial streams (3 of which were minimally stressed) in the San Diego hydrologic region multiple times to assess whether a benthic macroinvertebrate assessment index (the Southern California Index of Biotic Integrity [IBI]) developed for perennial streams could be used in nonperennial streams.We also sampled 3 minimally stressed perennial streams. Continuous water-level loggers and repeated site visits revealed that hydrologic regimes varied considerably among streams. Gradual drying was evident at some streams, and multiple drying/ rewetting events were evident at others. Moreover, streams that were nonperennial in 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 responded as expected in nonperennial streams. IBI scores were stable at most sites 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 fine sand macroalgae cover. These findings suggest that an assessment tool developed for perennial streams can be used to assess condition at certain nonperennial streams, and that biomonitoring program scan provide more comprehensive watershed assessments by including nonperennial streams in their surveys.

Full text:

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