Improving causal assessment through data-driven comparator site selection

R Mazor[1], D Gillett[1], and E Stein[1]

[1]Southern California Coastal Water Research Project Authority, Costa Mesa, CA, USA

Abstract

As bioassessment becomes an increasingly required component of stormwater monitoring, the need to identify causes of poor condition increases as well. In order to develop a causal assessment approach for use in California, evaluated the US EPA's causal assessment tool (CADDIS). Despite CADDIS's strengths, some modifications could optimize it for large-scale application in California. For example, CADDIS provides little guidance on how to select comparator sites – sites that provide data used to diagnose the cause of an impairment – under the assumption that only a handful of such sites are available. Thanks to California's regional assessment programs such as the Perennial Stream Assessment, or the Stormwater Monitoring Coalition's survey in southern California, potentially hundreds of sites could be screened. We developed quantitative approaches to support the selection of comparator sites. The characteristics of a good set of comparator sites are that they should: 1. Represent similar environmental setting as the test site and therefore potentially support the same biological expectation; 2. Cover a gradient of observed biological condition good to bad, bracketing the condition at the test site; 3. Comprise an adequate number sites to facilitate different analyses; and 4. Ideally contain sites meeting management objectives. We have tested two quantitative approaches to select comparator: one based on environmental gradients assumed to be related to biological community structure, and the other based on the site-specific biological expectations set by the California Stream Condition Index (which the Water Board uses to implement its biological integrity plan). At 15 test sites, quantitative approaches did a better job of meeting most of our objectives than traditional approaches (i.e., hand-selection of comparators by best professional judgment). Creation of querying tools that access public databases (such as CEDEN) could greatly accelerate the causal assessment process for streams in California..