Title: Prioritizing Management Goals for Stream Biological Integrity Within the Context of Landscape Constraints

Many streams are failing to achieve desired biological condition and require management decisions to restore designated uses. Some management goals may be impractical with limited resources, particularly in streams where large-scale changes on the landscape (e.g., urbanization) impose constraints on the upper limit of biological integrity. A statewide landscape model was developed that sets reasonable expectations for observed conditions within landscape constraints to prioritize management actions. The model provides a context for what is likely to be achieved at a given site independent of an actual bioassessment score. With this approach, sites can be ranked as over- or under-scoring relative to an expectation that is typical for the observed level of landscape alteration.

We developed a visualization tool to compare observed bioassessment scores with modelled expectations to rapidly identify reaches that were scoring better or worse than expected. Using this tool, a group of regulators, dischargers, stormwater agencies, and environmental advocates from the San Gabriel River watershed (Los Angeles County, California) identified regions in the watershed with consistent patterns in bioassessment scores relative to expectations. Based on these patterns, they prioritized different management actions for each region. Sites in both developed and undeveloped areas that scored below expectations were prioritized for restoration; in contrast, restoration was not a priority at developed sites where scores were low but within expected ranges. Sites scoring better than expected were prioritized for enhanced protection, as well as additional monitoring. Interactive tools that connect landscape models with observed data can help set management goals appropriate for stakeholder needs and likely constraints on biological integrity. These tools can easily be applied to other locations where biological data are used to assess environmental condition.

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Marcus is an ecologist in the Biology Department at the Southern California Coastal Water Research Project. He has experience in the development and application of open source programming tools for the analysis of water quality and bioassessment data. He received his Ph.D. and M.S. in conservation biology from the University of Minnesota, and his B.S. in zoology from the University of Florida. Prior to working with SCCWRP, he spent four years as a post-doc in the USEPA Office of Research and Development exploring time series methods for analyzing coastal water quality.